C³S·P·E·A·R™

climate-controlled-campus-self-propelled-electronic-adaptable-rack

ELLIPTICAL®

MOBILE SOLUTIONS

C^3-S.P.E.A.R. Operating Manual

I. WELCOME TO C^3-S.P.E.A.R.

Congratulations on your purchase of a C^3-S.P.E.A.R. unit manufactured by Elliptical Mobile Solutions, LLC. The C^3-S.P.E.A.R.'s rugged features have been designed and tested to work in harsh environments and should give you years of trouble-free usage. Please read this manual thoroughly so that you understand the proper setup and handling of your C^3-S.P.E.A.R.

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WELCOME TO C^3-S.P.E.A.R.

PLEASE READ FIRST!

Congratulations on your purchase of a C^3-S.P.E.A.R. unit from Elliptical Mobile Solutions, LLC. The C^3-S.P.E.A.R.'s rugged features have been designed and tested to work in harsh environments and should give you years of trouble-free usage. Please read this manual thoroughly so that you understand the proper setup and handling of your C^3-S.P.E.A.R.

We would like you to get the most out of your C^3-S.P.E.A.R.

When you FIRST use the C^3-S.P.E.A.R., you must know how to properly operate and care for it to avoid unsafe situations.

PLEASE read and understand this operator's manual and ALL the safety instructions before operating the C^3-S.P.E.A.R.

C^3-S.P.E.A.R. WARRANTY

Elliptical Mobile Solutions warrants this product against defects in manufacturing, materials, or workmanship for a period of twelve (12) months from the date shipped from the factory, covering parts, shipping, labor and service calls. Defective parts will be repaired or replaced with new or reconditioned parts at the company's option. Service calls will be next business day 9am to 5pm local time within the 48 contiguous states, excluding national and locally observed holidays. See extended region/international coverage supplement document. Exclusions and exceptions as listed below. This entire warranty is limited to the original consumer only and is **not** transferable.

Item and Services NOT Covered by This Warranty

- Defects caused by unauthorized work performed on the product.
- Part failure resulting from failure to maintain the product as specified in the manual.
- Product or part failures caused by unauthorized modification of the product. Unauthorized modification of this product **voids** this entire warranty.
- Any part, accessory, or modification – authorized or not – placed on this product which is **not** manufactured, supplied or installed by Elliptical Mobile Solutions.
- Any warranty or claim made by the reseller or agent contrary to, or in addition to, this warranty.

To Exercise This Limited Warranty:

- Contact warranty support at 1-888-924-0547. Elliptical Mobile Solutions will repair or replace the defective part(s) at the company's option **IF** the defect is a result of manufacturing, materials, or workmanship during the warranty period.

Warranty Limitations and Exclusions

To the maximum extent permitted by applicable law, this limited warranty **excludes** any claim for incidental or consequential damages AND is in lieu of any implied or other warranties. Elliptical Mobile Solutions reserves the right to make changes to this warranty at any time without notice.

Consumer Name: _____

Purchased From: _____

Date Purchased: _____

Model Number: _____ **Serial Number:** _____

SAFETY FIRST

READ THIS MANUAL BEFORE OPERATING THE C^3-S.P.E.A.R.

To prevent accidents, which can cause injury to you, damage the unit, or its contents:

1. ALL persons using the C^3-S.P.E.A.R. **MUST** read this operator's manual.

2. ONLY trained personnel should be allowed to operate the C^3-S.P.E.A.R.

3. Check that the wheels are UNLOCKED before operating the C^3-S.P.E.A.R.

4. Practice operating the C^3-S.P.E.A.R. in an open area on a flat surface free of obstacles. Have someone familiar with its operation available to assist you.

5. ALWAYS select the *Slow/Turtle* speed for training sessions, AND in narrow or crowded places – anywhere you risk damage or injury if moving fast.

6. ALWAYS be aware of your surroundings – operate slowly and cautiously. Be courteous of others and inform them that you are operating nearby.

7. AVOID collisions, which could damage the C^3-S.P.E.A.R. or its contents, shift the load inside it, or injure people around it.

8. ONLY operate the C^3-S.P.E.A.R. on smooth surfaces or ramps.

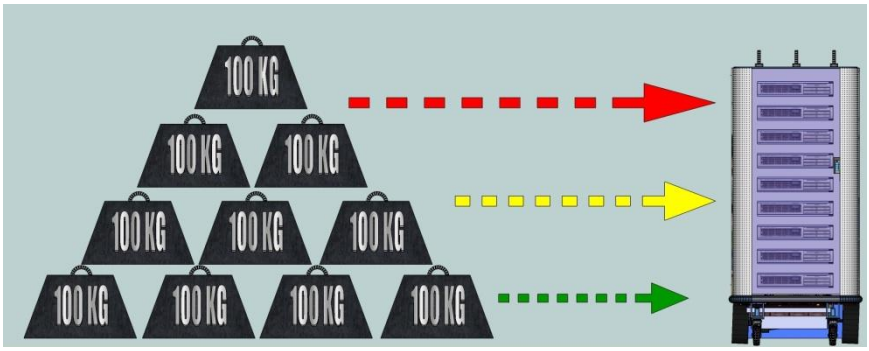
9. **DO NOT** operate the unit with a flat tire, broken wheel, or damaged caster part.

10. **DO NOT** travel diagonally up or down ramps and inclines.

11. **DO NOT** use the C^3-S.P.E.A.R. to push or pull anything.

12. ALWAYS turn the key switch *Off* before loading or unloading the C^3-S.P.E.A.R.

13. The C^3-S.P.E.A.R. has a maximum load capacity of 1000 pounds (454 kg). **DO NOT** exceed the rated 1000-pound (454 kg) capacity.



14. ALWAYS park, load and unload the C^3-S.P.E.A.R. on a flat, level surface. LOCK the wheels before loading and unloading the unit.

15. ALWAYS load the C^3-S.P.E.A.R. evenly, distributing the load to prevent tipping.

16. **DO NOT** manually release the electro-mechanical brake on or near an incline. If you must release this brake, release the brake ONLY when on a level surface and with the C^3-S.P.E.A.R. completely unloaded.

17. Maintenance procedures: Turn *Off* the C^3-S.P.E.A.R., lock the wheels and let motor cool. Then **DISCONNECT** the batteries before performing ANY maintenance. Contact your local Authorized Service Center for ALL major repairs. SEE “Maintenance” SECTION (Pages 23 – 26)

SAFETY SYMBOLS IN THIS MANUAL

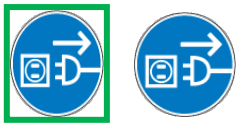
Electrical Hazard: Indicates an electrical hazard which, if not avoided, could result in injury or death.

Danger: Indicates a hazard which, if not avoided, could result in personal injury or damage to product or other property.

Tip Hazard: This equipment tips sideways easily.
Use extreme caution when unpacking or moving the unit.

Note: Indicates important information in this manual.

ON / OFF: Please turn the Key Switch in the direction required.



Plug / Unplug: Required step in maintenance procedures.

FEATURES

The C^3-S.P.E.A.R's welded steel frame supports up to 1,000 pounds (454 kg) of electronic equipment. Two rechargeable gel cell batteries propel it on four (4) locking caster wheels. The steel *Inner Frame* conforms to an industry standard rack format – 19" wide by 36" deep (48 cm. wide by 90 cm. deep). All rack rails are fully adjustable for depth, and the entire unit turns on its own axis. Standard patch panel can be used in the available 4U area. Single and dual air conditioners are optional, along with the secure ***Cyberlock® Key System***.

Drive System and Suspension

Two (2) gel cell batteries power the self-contained *Drive System*, which allows one person to move 1000 pounds (454 kg) of electronics up a 6% grade. The *IEC Charger Plug* and *Coil Cord* recharge this maintenance-free power system.

Two (2) layers of elastomeric material protect the *Inner Frame*. The first layer is specially formulated to dampen high-frequency vibration from ground or air transport. The second layer isolates the *Inner Frame* from low-frequency impact shock.

Equipment Power

Figure 1: Three L6-30/L5-30 Inlets

Three (3) or four (4) L6-30/L5-30 inlets are mounted left of the rear air designated for the air conditioner and the bottom (2) conditioner. The rear or top only air-conditioned models have (3) power inlets with the top inlets for equipment power. (see fig.1) The dual air-conditioned C^3-S.P.E.A.R has (4) power inlets with the top inlet designated for the top air conditioner, the one below that is the rear air conditioner and the bottom (2) inlets for equipment power. (See fig. 2) The equipment power pass-through has L6-30/L5-30 receptacles inside the enclosure.

Figure 2: Dual A/C Power Inlets

Caster Wheels

The C^3-S.P.E.A.R. moves on vibration-reducing caster wheels with precision ball bearings. The caster wheels lock for position and rotation.

Push down ⬇ on the *"Lock"* lever to lock them [Fig. 3] before loading or maintaining the C^3-S.P.E.A.R. Pull this lever up ⬆ to unlock them [Fig. 4] and operate the C^3-S.P.E.A.R.

Figure 3: Locked Wheel

Figure 4: Unlocked Wheel

Doors

The C^3-S.P.E.A.R. is equipped with a front door and one on each side. All doors use a multipoint latching system to maintain environmental seals and security.

To open the C^3-S.P.E.A.R. enclosure:

1. Insert the key or **Cyberkey®** (optional) into the lock assembly.
2. Rotate the door handle [Fig. 5] ninety degrees (90º) in either direction to release the latch.

Fig. 5: Door Handle

Air Conditioner

The air temperature within the C^3-S.P.E.A.R. can be controlled by an 8000 BTU *Air Conditioning Unit*. This air conditioner cools any electronic equipment inside the C^3-S.P.E.A.R. regardless of the temperature outside of it. The BTU cooling capacity diminishes as the outside temperature rises (see air conditioner manual for ambient temperature graph). Please refer to the supplementary air conditioner manual for operating instructions and additional information.

To REMOVE the Air Conditioner

1. Remove clevis pins from cart handle [Fig. 6]
2. Disconnect controller plug under cart. [Fig.7]
3. Lift the handle assembly up to remove from cart.

Figure 6: Clevis Pin

4. Remove the (4) 5/32” Allen head screws from patch panel. [Fig.8]
5. Remove patch panel.
6. Remove the (6) 5/32” Allen head screws from the air conditioner panel. [Fig.8]
7. Lift the air conditioner off of the C^3-S.P.E.A.R.

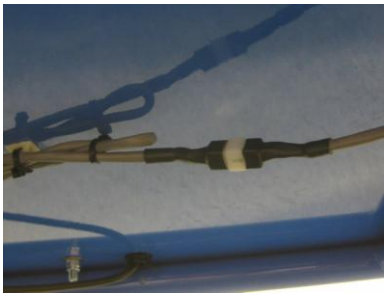


Figure 7: Cart Handle

Removing HEAVY equipment requires 2 people.

Figure 8: Screw Locations

Patch Panel

The C^3-S.P.E.A.R. is built with a four (4) U patch panel space which the customer can customize to their needs. The panel is located on the back of the enclosure. Customers may connect to their equipment without opening the C^3-S.P.E.A.R.

Use any 19-inch form factor patch panel or switch equipment which attaches to the C^3-S.P.E.A.R. by standard square-hole inserts.

Static Strap

Each enclosure is provided with a grounding wrist strap, cord and attachment point to prevent static discharge to electronic equipment. The anti-static strap should be used anytime equipment is being installed or serviced.

1. Remove wrist strap and cord from inside front door.
2. Fasten wrist strap to personal wrist.
3. Remove alligator clip from end of cord.
4. Insert banana plug on the cord into designated jack attached to inner frame. [Fig.]

Figure :Anti-static plug in

OPTIONAL FEATURES

Cyberlock® Key System

For the ultimate in security, the *Cyberlock® Key System* contains many features that aren't possible with a standard lock and key system.

- The lock installs without any wiring and does not contain a battery.
- A 3-volt lithium battery in the *CyberKey®* powers this system. This battery is easily replaced. Please refer to the *Cyberlock®* manual.
- *Cyberlocks®* do not utilize tumblers and cannot be picked like a mechanical lock.
- Dirt and moisture will not interfere with the operation of the lock cylinder.
- *Cyberlocks®* resist forced rotation and tampering – they are designed to remain in the locked position.

- It is impossible to create a duplicate of a *CyberKey®*.
- Passwords are unique to each installation.
- Each *CyberKey®* may be assigned unique permissions, including: which lock that particular key will open, the time of day it can access the lock, and when – based on beginning and expiration dates.
- Multiple *CyberKeys®* may be programmed alike or differently.
- The *CyberKey®* records the lock ID, date and time that it accesses the C^3-S.P.E.A.R. while the *Cyberlock®* records the key ID, date and time.
- Each *CyberKey®* can store up to 3900 access events and each *Cyberlock®* stores up to 1100 access events.
- Unauthorized attempts to open the *Cyberlock®* are also stored there.

Please refer to the manufacturer's *Cyberlock® Key System Manual* for more specific information regarding the programming and usage of this system.

Mission Critical Venting

The C^3-S.P.E.A.R. is available with independently controlled auxiliary ventilation system. If the primary air conditioner should fail, the enclosure will heat up. When the inside temperature reaches specified limit (factory setting is 100 degreed F) the exhaust fan will engage. The fan pressure will open both dampers allowing for open loop cooling. It is comprised of (2) gravity dampers, a fan and an adjustable thermostat control.

To Change Temperature Set Point

1. Change dial control on theromostat attached to inner rack back rail to desired temperature. [Fig.]

Figure : Thermostat Controller

Top Mount Air Conditioner

The C^3-S.P.E.A.R. is available with a top mounted air conditioner by itself or in conjunction with the rear mounted air conditioner. Please refer to additional manufacturer manual for operating instructions.

OPERATING THE C^3-S.P.E.A.R.

INSTRUCTIONS

1. Push the C^3-S.P.E.A.R. to an open area on a flat surface free of obstacles. Do not block ANY doorways, corridors, or emergency routes.

2. Position the C^3-S.P.E.A.R. close to an AC power outlet. The C^3-S.P.E.A.R. can be charged using any voltage between 90 and 240 Volts AC – depending on your particular needs and the national electrical standards. The specially- equipped *IEC Charger Plug* and *Coil Cord* [Fig. 11] are located near the front wheels.

Figure 11: IEC Charger Plug and Coil Cord

The C^3-S.P.E.A.R. also has a second charger cord that can be used if charging from the PDU is desired. To utilize the second cord- plug the 3 prong plug into the PDU. Then switch the plugs under the cart on the battery charger. Only one charger cord will work at a time. Only use extension cords and plug adapters rated for industrial/computer-grade usage in the country where the C^3-S.P.E.A.R. will be operating.

3. Turn the C^3-S.P.E.A.R. off and remove the key. Lock the caster wheels. **DO NOT CHARGE** if ANY cords are damaged or cut!

4. Push the coil cord completely into the AC power supply outlet.

5. Allow the C^3-S.P.E.A.R. to charge six to eight (6-8) hours for a full charge. For optimum battery life, charge the C^3-S.P.E.A.R. when not using it – this equipment cannot be over-charged.

6. The *Battery Condition Indicator (BCI)* blinks OFF every 5 seconds.
   The *BCI*, located on the control box, displays four (4) major battery conditions:
   Green – The batteries are fully (or nearly fully) charged.
   Yellow – The batteries are marginal. Charge them when convenient.
   Red – The batteries need charging. Charge them soon.
   Flashing Red – Charge the batteries immediately!

   SEE “System Check Levels” CHART [page] for more BCI details.

7. Unplug the *Charger Plug* from the wall outlet. **DO NOT** pull the cord out. Unplug any extension cords from the C^3-S.P.E.A.R. before turning it *On*.

8. Unlock all the caster wheels.

9. Insert the key or **CYBERKEY®** into the *Lock* located on the right side of control module and turn clockwise to start the C^3-S.P.E.A.R.

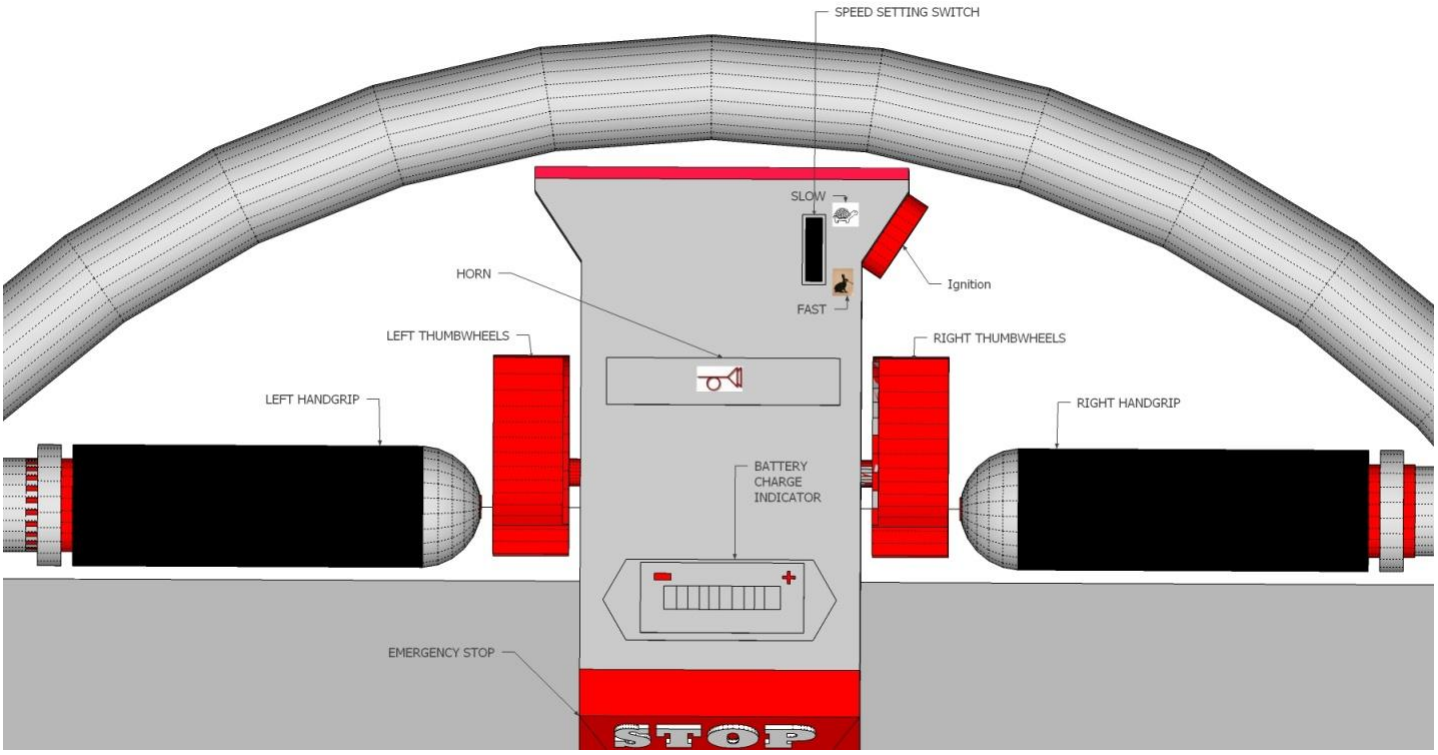


Figure 12: Control Panel and Hand Controls

10. The *Speed Setting Switch* is located on the control unit between the *Handgrips*. Select the desired speed by pushing either end of this rocker switch. Pushing down the *Turtle* selects the slow speed, while pushing down the *Rabbit* selects the fast speed. Please select *Slow* when operating the C^3-S.P.E.A.R. in narrow or crowded places.

11. Place both hands firmly on the Right and Left *Handgrips*. Place both thumbs on the Left and Right *Roller-Grip Thumb-wheels* and gently roll them in the direction you wish to travel.

    The farther AND faster that you twist the *Thumb-wheels* in either direction determines your speed. Driving speed is proportional to the force of your fingers on the *Thumb-wheels* – until it reaches the speed selected (*Turtle* or *Rabbit*).

12. Choose a direction to travel: forward or reverse. Gently twist the thumb-wheels away from you (clockwise) to move the C^3-S.P.E.A.R. forward, and twist the thumb-wheels toward you (counter-clockwise) to move the C^3-S.P.E.A.R. in reverse. Please move slowly when moving backwards.

The *Battery Condition Indicator* may fluctuate when the operator changes speed or moves across different types of surfaces.

13. To STOP quickly, push the *Emergency Stop Button* on the control unit.

14. If you release the controls for any reason, the *Dynamic Regenerative Braking System* automatically brings the C^3-S.P.E.A.R. to a smooth stop. It **DOES NOT** lock the drive wheels in place.

15. The *Electromechanical Braking System* then LOCKS the drive wheels in place. This parking brake works instantly if you press the *Emergency Stop Button.* The drive wheels **MUST BE** touching the floor surface for this brake to hold.

16. To restart the C^3-S.P.E.A.R., turn the key *Off* and then back *On*.

17. If the drive system is left on for more than 20 minutes it will time off. Turn key *OFF* then *ON* to restart.

To Operate the C^3-S.P.E.A.R. Manually

DISABLE the drive system:

1. Push the C^3-S.P.E.A.R. to an open area on a flat surface free of obstacles. **DO NOT** block ANY doorways, corridors, or emergency routes.

Figure 13: Brake Handle

2. Lift the *Brake Handle* located near the drive wheels to DISABLE the *Electromechanical Parking Brake*. [fig. 13]

LOADING THE C³-S.P.E.A.R.

3. Turn the key *Off* to disable the *Dynamic Braking*.

DO NOT release ANY brakes on or near an incline.
The unit will **NOT STOP** when the *Braking Systems* are disabled.
Severe injury MAY result if you release the controls.

To Secure the C³-S.P.E.A.R. for Transport

1. Push the C³-S.P.E.A.R. onto the vehicle that will transport it. Turn it *Off*.
Lock the caster wheels.

Figure 14: Tie-down Ring

2. ATTACH sturdy transport straps to the C³-S.P.E.A.R. through the four (4) *Tie-down Rings* [Fig. 14] located in each corner of the C³-S.P.E.A.R.'s top.

3. SECURE the straps to the vehicle's tie-down system.

4. Evenly TIGHTEN each strap until the C³-S.P.E.A.R. cannot move.

1. Rotate caster wheels so their brake levers are perpendicular to cart frame. Push the *Brake Locking Lever* down to lock the wheels. [fig. 15]

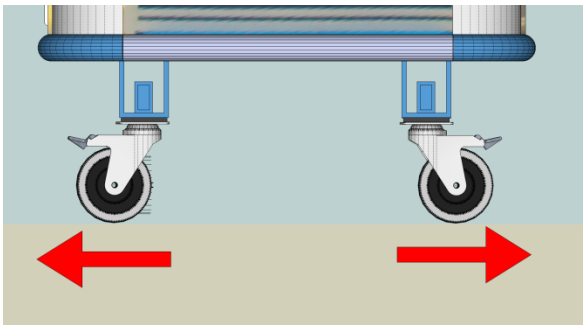


Figure 15: Perpendicular Caster Wheels

2. Open the front and rear doors of C^3-S.P.E.A.R. using the keys or the supplied **CYBERKEY™** system (Refer to supplemental manual).

CHECK that front and back caster wheels are pushed APART before opening the doors of the EMPTY unit**.**

3. Load C^3-S.P.E.A.R. with the heaviest equipment mounted at the bottom of the 19 inch rack and lightest equipment on the top rack. [fig. 16]

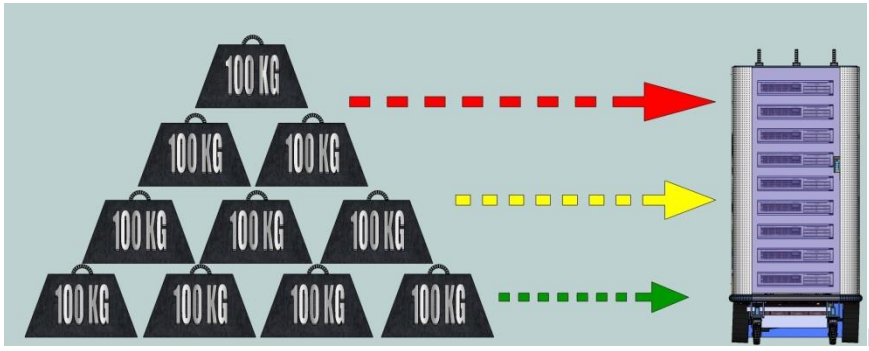


Fig. 16

Battery Life

Battery life depends upon use and proper care. If you use the C^3-S.P.E.A.R. a lot, your batteries will need replacement sooner than if you use the unit less often.

MAINTENANCE

BATTERIES and CART

Other factors which can reduce battery life include:

- Irregular or inefficient charging
- Extreme temperatures and cargo weight

You may need to replace the batteries if the distances you travel on a charge become noticeably shorter, ramps become more difficult to ascend, or the batteries get hot or swell – sometimes giving off an acrid odor. Please have your battery load-tested at an Authorized Service Center if you notice any of these problems. SEE BELOW

Circuit Breaker

A circuit breaker is attached to the positive (+) terminal of one (1) battery. The circuit breaker protects the wiring and batteries against damage from a short circuit.
If a breaker opens, reset it by pushing the tab down. [fig.17]
CHECK for a short circuit **immediately** if it opens repeatedly in a short time.

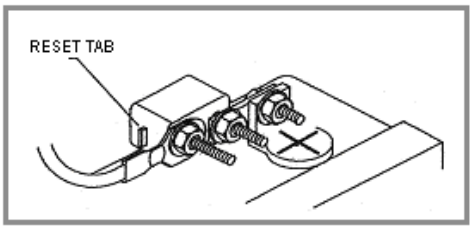


Figure 17: Circuit Breaker Reset

DO NOT tape the tab down so it cannot open!
DO NOT remove OR bypass the circuit breaker!

Battery Maintenance

The C^3-S.P.E.A.R is powered by maintenance-free, sealed AGM batteries.

NEVER remove the battery caps.

NEVER add water. This will ruin your batteries and **void** your warranty. Liquid-electrolyte batteries are **NOT** recommended for the C^3-S.P.E.A.R.

Turn *Off* the C^3-S.P.E.A.R., lock the caster wheels, and let the motor cool. DISCONNECT the batteries before performing ANY maintenance.

CHECK the battery terminals often for a crusty or powdery white substance.

Gently scrub them with a solution of baking soda and water using a toothbrush. **DO NOT** allow this solution to enter the battery vents. **DO NOT** leave this substance on the battery for any length of time.

Not cleaning the battery when you FIRST notice this white substance will reduce the quality of the battery's connection and affect its performance.

CLEAN the battery terminals and battery posts using a wire brush when replacing the batteries.

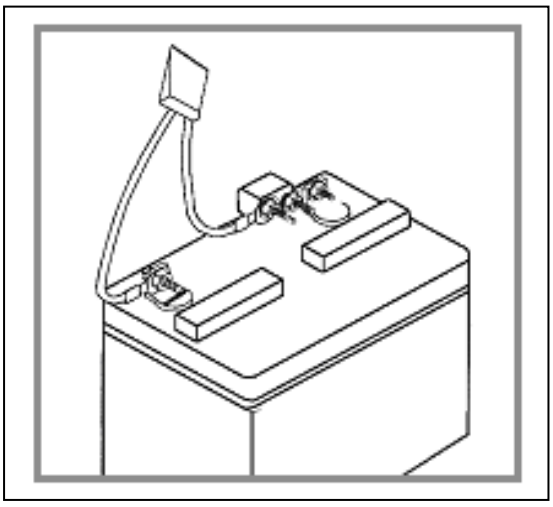


Figure 18: Battery Connections

Be sure ALL connections are tight when attaching the terminals to a new or clean battery. The **black** wire MUST be attached to the negative (-—) terminal. [fig. 18]

Failure to connect the wires properly WILL damage the C^3-S.P.E.A.R. and **void** any warranty.

General Maintenance Schedule

A properly-maintained C^3-S.P.E.A.R. will give you years of safe and dependable service. We recommend the following maintenance program. Please perform this maintenance program more frequently if you use the C^3-S.P.E.A.R. often.

ONLY Authorized Service Technicians should inspect or service the C^3-S.P.E.A.R.

Turn *Off* the C^3-S.P.E.A.R., lock the caster wheels, and let the motor cool. DISCONNECT the batteries before performing ANY maintenance.

Every Day or As Needed:

1. Maintain the batteries' charge. Check them for the white substance.
2. Clean all debris from the wheels and drive unit assembly.

Once Every Month:

1. Check for loose connectors and any signs of unusual wear.
2. Grease the caster-wheel swivel assemblies. Use ONLY industrial-grade grease.

Once Every Three Months:

1. Clean the C^3-S.P.E.A.R. with water and a damp sponge. [no cleaning fluids]
2. Check the wires for wear, fraying or cracking.
3. Check the connectors for wear or cracking.
4. Examine the tires for wear or damage.

Once Every Year:

Take the C^3-S.P.E.A.R. into an Authorized Service Center.
A technician will check the motor brushes for wear and load-test the batteries.
Fully charge the batteries before taking it to the service center.

A "load test" measures battery voltage under a heavy load. An open-circuit voltage test **must** measure at least 12.6 volts on each battery. Then, if the load test voltage is below 10.0 volts for each battery, they should be replaced.

Maintenance Procedures

Turn *Off* the C^3-S.P.E.A.R. Lock the caster wheels, and let the motor cool.

DIAGNOSTICS & TROUBLESHOOTING

DISCONNECT the batteries before performing ANY maintenance.

Clean the C^3-S.P.E.A.R.

1. Turn the key *Off* and disconnect the batteries.
2. Use warm soapy water and a damp sponge to clean the C^3-S.P.E.A.R.
   DO NOT use a water hose to rinse your C^3-S.P.E.A.R. Excessive water may damage electronic components and **void** any warranties.
3. Clean the tires with a bristle brush dipped in warm water.

DO NOT use harsh or abrasive cleaners on the C^3-S.P.E.A.R. or its tires.
These cleaners will damage the C^3-S.P.E.A.R.'s metallic finish and the tires.

Lubrication: All wheel bearings are sealed and permanently lubricated. Spray silicone lubricants (or WD-40[1]) may be used on any other moving parts. Apply this lubricant whenever a moving part is not functioning correctly

[1] WD-40 is a registered trademark of the WD-40 Company and not affiliated with Lift Products.

DIAGNOSTICS & TROUBLESHOOTING

BASIC PROBLEMS AND SOLUTIONS

The C^3-S.P.E.A.R. has been designed and built to be dependable and trouble-free.

There can be unexpected problems with any technical product.

Please follow these lists to fix most problems.

Call our Service Hotline: 1-888-924-0547

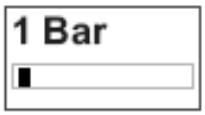
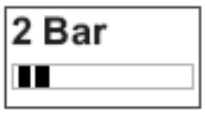
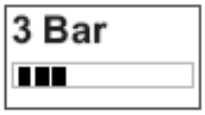
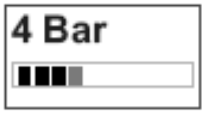
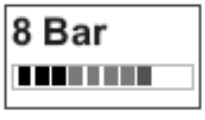
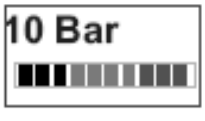
SYMPTOM	POSSIBLE CAUSE	SOLUTION
Battery Gauge dark	Key Switch turned to *Off* position.	Turn Key Switch to *Drive* position.
	Emergency Brake *On*.	Turn Stop Switch *Off*, then *On*
	Circuit Breaker open.	Check and re-set the circuit breaker.
	Batteries dead.	Charge batteries. Load test batteries at Service Center.
	Power connection interrupted.	Check power cable to battery.
	Fuse blown on main control board.	Check service manual.
Unit dead with Battery Gauge light on	Obstruction in pathway of wheels.	Check for obstruction
	Motor worn out.	Contact an Authorized Service Center
Unit runs slow OR Unit runs fast	Speed Switch set to *Turtle*	Select *Rabbit* speed setting.
	Weak or low batteries.	Charge batteries.
	Worn batteries.	Charge batteries. Authorized Service Technician can load test batteries if problem continues.
	Low tire pressure (if air tires).	Check tire pressure and inflate to proper pressure (50 psi)
	Battery charge low.	Charge and load test batteries.
Battery Weak OR Not Charging Properly	Charger power interrupted.	Check wall outlet and power cords for continuous power. Check that the room's light switch is not connected to THAT outlet. Check for local power outages.
	Charger burned out.	Replace charger at Authorized Service Center.
	Loose connection in wiring.	Check all exposed wire connections.

		Continued
Intermittent running	Worn motor brushes.	Authorized Service Technician must check all brushes. Replace any worn brushes.
Hard to turn	Low tire pressure (if air tires).	Check tire pressure (50 psi)
	Casters require lubrication.	Lubricate casters.
	Damaged caster bearings.	Replace casters at Authorized Service Center.

DIAGNOSTICS & TROUBLESHOOTING

SYSTEM CHECK LEVELS

Battery Condition Indicator

	The batteries need charging or there is a bad connection to the batteries. Check the connections to the batteries. If the connections are good, try charging the batteries.
	There is a bad connection to the motor. Check all connections between the motor and the control system.
	The motor has a short circuit to a battery connection. Contact your service provider.
	Not used.
	Not used.
	The controller is being inhibited. This may be because the parking brake is disengaged, or the emergency stop switch is engaged. Push the brake lever down to engage the parking brake, or recycle the keyswitch.
	A throttle fault is indicated. Make sure that the throttle is in the neutral (rest) position before switching on the Cart.
	A controller fault is indicated. Make sure that all connections are secure. Contact your service provider.
	There is a bad connection to the parking brake. Check all connections between the parking brake and the controller.
	An excessive voltage has been applied to the controller. This is usually caused by a poor battery connection. Check the battery connections.

The BCI will display more bars for serious problems.

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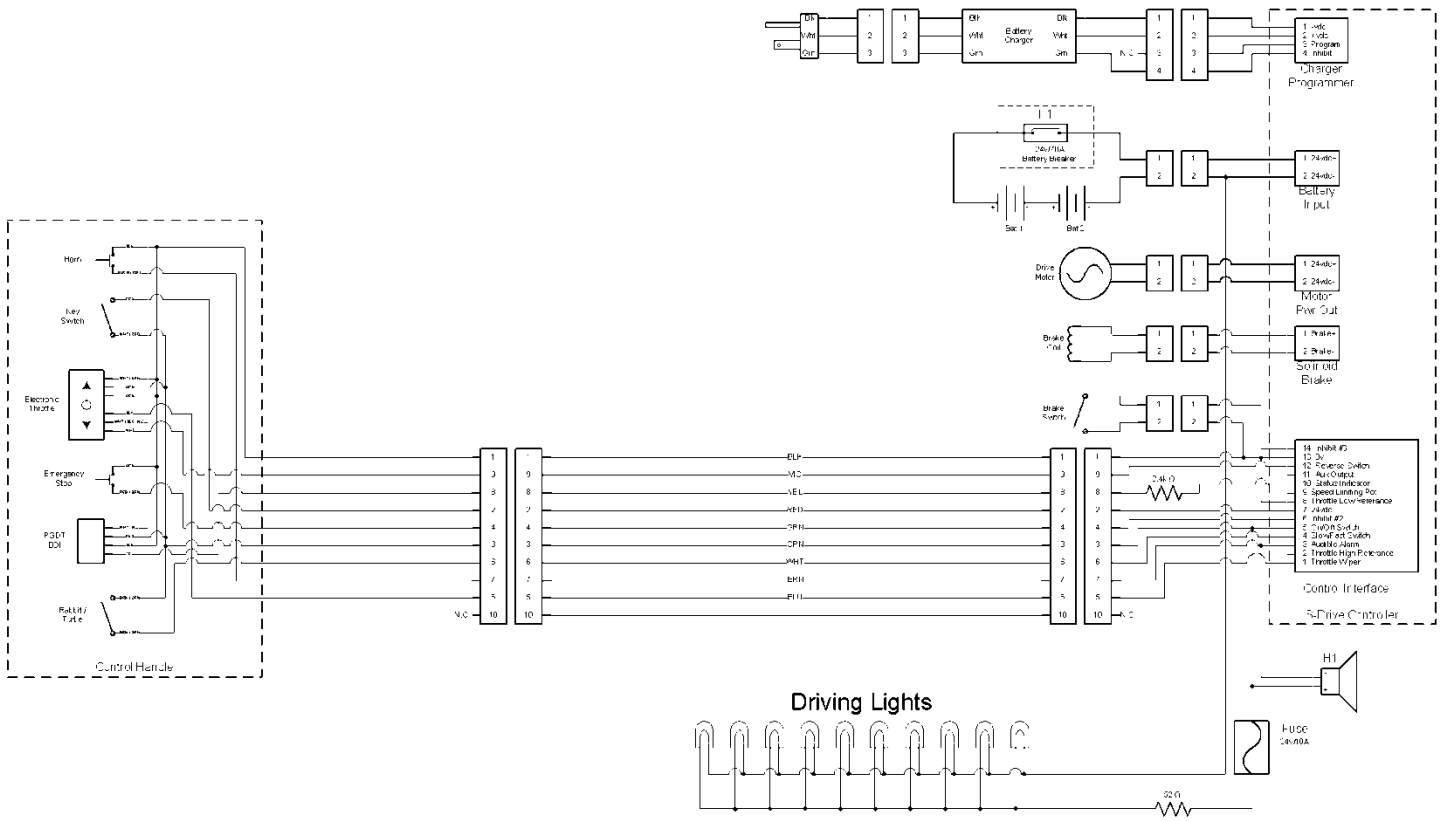

Elliptical Mobile Solutions 455 East Chilton Drive Suite 1 Chandler, Az 85225 (480)224-0647					
Date 10/28/2009	**Project** C-Spear Wiring Schematic		**Designer** Josh Sampson	**Drawing number** C-HEAD-01	**Page #** 1 of 1

SPECIFICATIONS / DIMENSIONS

C^3- S.P.E.A.R.

Overall length	66 in. (166 cm.)
Overall width	24 in. (60 cm.)
Overall height Overall height with top mounted AC	61 in. (154 cm.) 73 in. (185 cm.)
Inner frame	19” wide by 36” deep 48 cm. wide by 90 cm. deep
Weight with rear air conditioner	800 lbs. (363 kg.)
Weight with top and rear air conditioner	940 lbs. (426 kg.)
Weight capacity of installed equipment	1,000 lbs. (454 kg.)
Mobility range – on 1 battery charge (optimal conditions)	10 miles (16 km.)
Speed	2.6 m/ph (4 k/ph)
Operational temperature (optimal)	0˚F to 120˚F* (17˚C to 49˚C)
IEC charger and lighting voltage	90 – 240 Volts AC 50/60 hz
Battery charge (length of time)	6 – 8 hours

NOTES

Air Conditioners

Keep This Guide
With The Equipment
At All Times

CAUTION

Read Manual Before Installation.
For Questions, Please Call ISC at
1-800-836-7472
To Be Professionally Installed Only.

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Return Material Authorization (RMA) Procedure	14
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Before installing

ISC air conditioning equipment is carefully designed to cool and dehumidify the air in electronic component enclosures. ISC has designed air conditioners for all types of electronic equipment enclosures providing capacity from 1,000 to 20,000 BTU. Built in internal air heaters are optional

Use this guide for general instructions to properly install and operate the ISC air conditioning equipment. Installing and mounting instructions are on page 5 and specifications are found on page 6.

Inspecting the Equipment

ISC air conditioning equipment is designed, manufactured and packed to prevent damage from normal handling, dropping, shock and vibrating during shipment. It is necessary to inspect your ISC equipment upon receipt to insure that there is not visual or hidden damage.

Upon receipt of the equipment, insure that it is always top side up as indicated by "THIS SIDE UP" labels; this insures that the compressor oil is not displaced. If the equipment has been on its side it must be put upright for at least 24 hours before installing or running to insure the compressor oil has returned to the compressor. All physical damage to packing or signs of damage to the equipment must be noted on the freight bill of lading. Packages must be opened after receipt to inspect for any internal / concealed damage to the equipment and to verify proper count and order fulfillment. Shipments delivered without the pallet, not topside up, other freight on top, damaged or wet should be refused delivery.

Contact the shipper immediately upon discovery of shipping damage to schedule inspection by the freight company. Keep all packing. ISC, Inc. cannot take responsibility for customer's failure to file freight damage claims on a timely basis.

Moving the Air Conditioner

Read this guide completely before running or installing your ISC air conditioning equipment.

Perform the Preliminary Test on page 5 before mounting or installation.

Prepare the enclosure that is to be cooled for mounting in accordance with this guide and the template supplied.

Preliminary test must be performed before mounting or installing the air conditioner.

ISC air conditioning equipment must be mounted vertically with a minimum of 4" air space for condenser air return and supply. If necessary, equipment may be mounted at up to a 5 degree angle (rotary compressors) without damaging equipment compressor.

If air conditioner is to be shipped or transported at any time; pack in original packaging and strap to pallet to prevent damage. Air conditioner must be kept upright at all times.

WARNING:

Before operating the air conditioner, inspect all electrical wiring to ensure proper installation and wiring to the proper power source. The minimum circuit amperage must be 125% greater than the air conditioner label amperage listed for the voltage selected. For proper installation, use a 15 amp circuit breaker as a minimum.

Air conditioners are not designed to be shipped attached to an equipment enclosure. If this is required, the air conditioner must have sufficient support to prevent damage due to vibration and shock. Air conditioners shipped which are internal damaged due to shipping attached to enclosures are warranty voided.

To Unpack ISC air conditioning equipment

Always keep air conditioner top up as shown by the packaging label and arrows.
If the unit is to be transported after initial unpack and inspection, place air conditioner back in original packing to prevent damage.

For shipment by UPS or freight carrier, repack as received and re-band to the pallet. Shipping without being strapped to the pallet may result in tipping and damage and voids the warranty.

Serial Number Label

The Air Conditioner label includes the:
Model Number
Serial Number
Compressor amps
Heater amps
NEMA Type
Type of Refrigerant
Amount of Refrigerant Required
Design Pressures
Underwriters Laboratories Inc. logo (if unit is UL listed)

Be sure to record the data from the label onto the back of the manual and in a safe place for warranty and ordering parts.

To prevent damage to equipment, electrical panel and wiring, and to prevent personal injury, assure that the power source is compatible with the equipment before operation.

When recharging, refrigerant type and amount must be the same as the shown on the unit label or

air conditioner will not operate properly or may be damaged; voiding the warranty.

Operation

The ISC air conditioner will lower (or heat as necessary) the air inside an enclosure to ensure its proper operational temperature. ISC air conditioners, when sized properly, will provide cooling or heating as necessary, automatically, controlled through the digital, programmable thermostat.

ISC air conditioners operate as a “closed loop” where the enclosure air is taken into the ISC air conditioner and ether cooled or heated, and then returned to the enclosure with no exposure to or introduction of outside / ambient air. This assures the enclosure is separated from and is not contaminated with ambient air dirt, chemicals, dust, moisture or foreign mater so that sensitive enclosure components are protected and kept cool / warm / dehumidified.

Warm enclosure air is removed by the ISC air conditioner refrigeration cycle, as is excess humidity removed. The humidity condenses to liquid and then is changed back into vapor by the Condensate Removal System where it is then vented to the atmosphere. In the event of excess water vapor where the enclosure door has been left open there is an overflow hole on the bottom of every unit. Please contact ISC if you encounter excess water coming from your air conditioner.

Required heat to the enclosure is provided by an optional thermostatically operated heater. The evaporator fan runs continuously to provide the required climate control to the enclosure. Refrigerant low pressure and high pressure safety switches shut the compressor off if the evaporator coil begins to ice up or if the condenser coil overheats. The temperature control display will blink on and off to indicate a low pressure or high pressure cutoff. Refer to the service section for corrective action.

The refrigerant thermal expansion valve assures optimum cooling efficiency through a wide range of operating temperatures. It requires no adjustment or maintenance.

Compressor heaters are available for cold ambient temperatures. Very low ambient temperature and high ambient temperature options are available.

The programmable thermostat protects the unit by delaying restart after power failures, disconnects or manual restarting. Optional fault detection and alarm are available. Please call ISC for information.

A stainless steel enclosure and corrosive environment option is also available with condenser coils coated with a cutting edge high efficiency electrically applied corrosion resistant coating.

Building Circuits

It is optional that all 120 or 208-230 volt air conditioners have power supplied by a dedicated 15 amp circuit minimum and a 15 amp fuse or 15 amp circuit breaker. Please check local codes for specific requirements in your area. **Wires with ground AND neutral must comply with local code requirements.**

If adding the air conditioner to an existing circuit that is in use; the fuse or circuit breaker must be properly sized for the added equipment load. Operating enclosure equipment with an unbalanced electrical supply load or with improperly sized circuit breakers may damage customer’s enclosure and void customer’s enclosure equipment warranty. Always determine whether other equipment on the same circuit will be damaged or effected by an unbalanced load.

Preliminary Testing

Before mounting the air conditioner to the enclosure, test for proper operation. Follow the steps below prior to installation.

WARNINGS

The air conditioner must sit upright for 24 hours to assure the compressor oil has drained down to the compressor. Check the serial number label to assure the electric power available to the air conditioner is the proper voltage, phase and amperes / KWH. Check electric power source for proper ground wire and neutral wire installation.
Assure that the electric power is protected by an appropriately sized fuse or circuit breaker.
Plug the unit in to start the evaporator fan and if desired to re-set the temperature controller. Referring to the thermostat programming instructions in this guide **(pages 9-12)**, program the air conditioner programmable temperature controller for the cold air and heater. Factory settings should be satisfactory, however you may want to adjust the heat / cooling set points for your specific application.

PLEASE SEE PAGES 9-12 OF MANUAL FOR COMPLETE INFORMATION ON CONTROLLER

The condensing fan is controlled by the refrigerant high heat pressure and will come on later when the operating pressure builds up. This feature allows low ambient operation and reduces current inrush when the unit comes on.

- Run the air conditioner for 15 minutes; during this time the condenser fan will come on after the condensing coil warms up.
- Turn the unit off if any the equipment makes any unexpected or hard mechanical noises or vibrations and refer to trouble shooting guide; if the trouble shooting guide fails to remedy the problem call ISC Customer Service.
- The supply cold air should be at least 10 degrees F colder than the return air entering the unit. If it is not, refer to the trouble shooting guide; if the trouble shooting guide fails to remedy the problem call ISC Customer Service.
- When you are satisfied that the unit is operating properly, turn the unit off, disconnect from the power and mount the unit on the enclosure to be cooled in accordance with the instructions with the enclosure and this guide. If the air conditioner's cover has been removed during the preliminary test, be sure to replace it with **all** the screws supplied to assure a closed loop of clean enclosure air. Take care to keep all wires out of seal areas and away from moving parts.

Mounting the Air Conditioner

Using the template supplied; determine where the air conditioner is to be mounted and assure that all required cuts and holes will not interfere with or damage the enclosure. Assure that there is 6" clearance between walls / obstructions and the air conditioner for the condenser supply air and return air flow so that it is not restricted. Restricted condenser air flow will affect the air conditioner's performance. If mounting the air conditioner on the enclosure's door see special note in this guide. Mount the air conditioner high on the enclosure in order to cool the hot air in the top of the enclosure. Position the unit where the cold air can circulate across the width of the enclosure to cool it all the way across.

Once proper mounting placement is determined, turn the enclosure equipment off if possible to prevent damage. Drill and cut the holes as indicated on the mounting template. Install insulation gasket as required to insure an air tight closed loop seal. Be cautious not to let any cutting debris fall into the enclosure. Attach the ISC hanging bolts as indicated on the template to hold the unit onto the enclosure and then use the six mounting screws that are provided.

Hang the air conditioner on the ISC hanging bolts and from inside the enclosure, use the six fasteners supplied to attach the air conditioner to the enclosure from inside the enclosure. Insure that these fasteners are tight in order to prevent the unit from falling off of the enclosure. These fasteners should be checked periodically to insure that they have not become loose due to vibration.

E

nsure that the power supplied is compatible with the air conditioner's power requirements seen on the air conditioner serial number plate. Properly attach the unit's power cord to a circuit with a minimum 15 amp capacity circuit breaker and proper voltage of 120 volts, 60 Hz or 208-230 volt. Please check the specification plate on the unit for exact amp rating. Use fuse if no circuit breaker is possible. Test the voltage at the receptacle for proper polarity and good ground.

After mounting the air conditioner, replace / close the enclosure door and start air conditioner; test for air leaks to assure a proper closed air loop seal and run test the unit to assure proper operation after mounting. If any cold air leaks are found, check for proper mounting and apply silicone-free Lexel sealer if leaks persist. Assure that the air conditioner's condenser inlet air filter is installed properly and cleaned regularly.

Caution

If mounting the air conditioner to the enclosure door, confirm with the enclosure manufacturer that the door's hinges will support the air conditioner's added weight (see equipment specifications). Insure that when the door is fully open that the enclosure will not topple over due to the off-center load.

Unit Specifications

Model	BTUH	Standard Maximum Ambient	Volts	HZ	Running Amps	Refrigerant Amount
NE010-126	1,000	125°F	120	50/60	3.44	12.00 oz
NE010-236	1,000	125°F	230	50/60	2.06	12.00 oz
NE015-126	1,500	125°F	120	50/60	3.49	12.00 oz
NE015-236	1500	125°F	230	50/60	2.06	12.00 oz
NE020-126	2,000	125°F or 131°F	120	50/60	3.76	12.75 oz
NE030-126	3,000	125°F or 131°F	120	50/60	5.15	12.75 oz
NE040-126	4,000	125°F or 131°F	120	50/60	5.53	11.00 oz
NE040-236	4,000	125°F	230	50/60	3.26	11.00 oz
NE050-126	5,000	125°F	120	50/60	7.83	15.25 oz
NE050-236	5,000	125°F	230	50/60	4.07	15.25 oz
NE060-126	6,000	125°F	120	50/60	7.83	19.00 oz
NE060-236	6,000	125°F	230	50/60	4.95	19.00 oz
NE080-126	8,000	125°F	120	50/60	8.70	21.00 oz
NE080-236	8,000	125°F	230	50/60	5.05	21.00 oz
HC100-236	10,000	125°F	120	50/60	16.3	27.00 oz
HC100-236	10,000	125°F	230	50/60	8.12	27.00 oz
HC120-126	12,000	125°F	120	50/60	16.3	27.00 oz
HC120-236	12,000	125°F	230	50/60	8.12	27.00 oz
HC150-236	15,000	125°F	230	50/60	8.41	
HC200-236	20,000	125°F	230	50/60	11.27	

Replacement Components

Contact ISC at 800-836-7472 for all replacement parts and questions

Configuration

Active Evaporator Condensate Boil Off System
High Refrigerant Pressure Cut Out Switch
Low Refrigerant Pressure Cut Out Switch
Programmable Digital Temperature Control Thermostat with LED display
Condenser Fan Cut-in Control Switch
Powder coated to prevent rust
16 gauge cold rolled steel chassis and shroud
Chassis and Shroud seal system insures closed loop air circulation
Condenser inlet air filter
Easy removable fans, compressor, components
8 foot long power cord (12 foot optional)
Thermal expansion valve provides high performance over wide temperature range
Internally insulated to minimize case heat loss
Schrader valves on low AND high pressure service ports.
Most models have quiet, long-life rotary compressors
Rotary compressors are tolerant - will start and run in low voltage conditions High efficiency performance = high BTU per KWH for minimal electricity cost Nitrogen flow process used in brazing minimizes service issues and increases service life.

Preventative Maintenance

Air conditioners require regular cleaning of the condensing air inlet filter. Wash filter often if washable using proper cleaning compound and back flushing the dirt out, or replace if not washable whenever it appears physically dirty. Restriction to the flow of air over the condenser coil will degrade the performance of the equipment, cause it to overheat, reduce cooling and can damage the compressor. The overload switch in the compressor may cause the compressor to cycle if the condensing coil pressure becomes too high due to air restriction. A further safety is the refrigerant high pressure cut off switch which will cut off the compressor if the condensing pressure becomes too high due restricted condenser air flow or some other cause.

Restricted air flow due to neglecting a dirty filter will cause unit to safety off and then turn back on after it cools off over and over (cycling). Operation in this overheat / shut down / cool down / restart mode will damage the equipment and void the warranty.

Air Filter Service

Remove the air conditioner filter and wash if washable or replace if not washable. Dry thoroughly before replacing. ISC Air Filter Treatment Spray in aerosol cans or spray bottle is recommended to enhance any air filter efficiency. Replacement filters are readily available from ISC Customer Service. DO NOT operate the air conditioner without the air filter. Such operation will allow the condensing coil to become dirty and loose efficiency, causing overheating and diminished cooling capacity. Dirty condensing coils must be back-flush cleaned using proper commercial coil cleaning compounds and thorough back-flush rinsing. Refer to directions on the cleaning compounds selected. Acid wash is not recommended as it reduces the life of the coil.
Note: do not use solvents to clean the programmable thermostat. Wipe with mild soap and water.

Condenser and Evaporator Fans:

ISC air conditioners use high efficiency long life (high duty cycle) high tech ball bearing fans engineered for optimum performance. The bearings are sealed and require no maintenance. Keep fan blades clean for optimal performance. Fans are removable and attached by plug in connections.

Compressor

ISC uses hermetically factory sealed compressors that are quiet, low vibration and are maintenance free. Overheat sensors are installed to protect the compressor from damage due to overheat. If the compressor, compressor overload sensor or thermal expansion valves fail, it is recommended to return the unit to ISC Customer Service for proper replacement. Capacitors are easily customer maintenance removed and replaced. Note that the rotary compressor runs with compressed refrigerant gas on the outer case and therefore is **hot** to the touch.

Loss of Refrigerant

ISC air conditioners are meticulously leak and run tested after assembly.

If a leak in the system should develop due to shipping damage or mechanical vibration, the leak must be detected, repaired and the refrigerant charge restored to the system by a qualified refrigeration professional.

Moving the Enclosure and the Air Conditioner

If the enclosure the ISC air conditioner is mounted to must be moved; remove the air conditioner from the enclosure and move the air conditioner and enclosure separately. Moving an enclosure with the air conditioner mounted may damage the enclosure and the air conditioner and void the warranties. Refer to “Moving The Air Conditioner” on page 3 in this guide.

Digital Temperature Controller

Overview

The microprocessor-based digital temperature controller performs the functions of controlling the enclosure temperature while monitoring operating limits and refrigerant pressures. Temperature indication and compressor and alarm status are indicated on the front panel. It also records the maximum and minimum temperature limits within the enclosure.

The controller includes a compressor anti short-cycle time delay for compressor protection. A bypass time delay prevents nuisance trip outs caused by cold weather start ups and transient high temperature limits.

If any of the critical control parameters exceed limits, the compressor is turned off, an alarm condition is indicated on the front panel. If the preset temperature limits are exceeded, the compressor continues to operate but there is a temperature limit alarm.

The temperature set point, which is the lower limit of regulation, can be adjusted within specified limits. The temperature turn-on point is set-point plus differential.

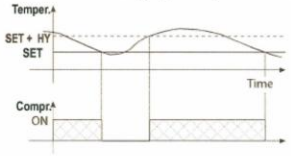
NOTE: In high ambient operation (above 1150F) the turn-on temperature should not exceed 1000F/380C, due to the need for compressor cooling.

The High Temperature alarm can be adjusted to suit customer needs within specified limits.

COMPRESSOR

The regulation is performed according to the temperature measured by the thermostat probe with a positive differential from the setpoint. If the temperature increases and reaches setpoint plus differential, the compressor is started and then turned off when the temperature reaches the set point value again.

In case of fault in the thermostat probe, the start and stop of the compressor are timed through preset parameters.



FRONT PANEL COMMANDS

- **SET** To display target setpoint
- **Defrost:** Not enabled
- (UP): To see the maximum stored temperature
- (DOWN): To see the minimum stored temperature
- **Power Switch:** Not enabled
- Not enabled

KEY COMBINATIONS

- ▲ + ▼ To lock & unlock the keyboard
- SET + ▲ To return to the room temperature display
- SET + ▼ To enter programming mode

LED FUNCTIONS

LED Functions		
LED	MODE	FUNCTION
❄	ON	Compressor enabled
❄	Flashing	Anti-short cycle delay enabled
(( ))	ON	An alarm is occurring
❄	ON	Continuous cycle is running
☀	ON	Energy saving enabled
°F	ON	Measurement unit
°F	Flashing	Programming phase

Functions and Parameters

Temperature Controller Set Points

Function	Operation	Parameter	Operating Range	Factory Set Point
Temperature Units	Select units	F	°F	°F
*Cooling Differential	Control hysteresis	Hy	1 to 45°F	5°F
*Compressor Protection	Anti- short cycle	AC	5 to 45 minutes	5 minutes
*Cooling Set Point	Set auxiliary relay	Set	45 to 100°F	90°F
Alarm Functions				
*Max Alarm Temp	Panel indicator	ALU	230°F	105°F
HI/LO Ref Press	Presure switch	CA	NC switches (2)	Fixed
*Note: Parameters are field adjustable				

Main Functions

HOW TO SEE THE SETPOINT

1. Push and immediately release the **SET** key. The display will show the setpoint value
2. Push and immediately release the **SET** key or wait for 5 seconds to display the probe value again.

HOW TO CHANGE THE SETPOINT

1. Push the **SET** key for more than 2 seconds to change the setpoint value;
2. The value of the setpoint will be displayed and the ""F" LED starts blinking;
3. To change the **SET** value, push the **UP** or **DOWN** arrows within 10 seconds.
4. To memorize the new setpoint value, push the **SET** key again or wait 10 seconds.

HOW TO CHANGE A PARAMETER VALUE

To change the parameter's value, operate as follows:

1. Enter the Programming mode by pressing the **SET + DOWN** keys for 3 seconds. The **°F** LED starts blinking.
2. Select the required parameter. Press the **SET** key to display its value.
3. Use **UP** or **DOWN** to change its value.
4. Press **SET** to store the new value and move to the following parameter.

To exit: Press **SET + UP** or wait 15 seconds without pressing a key

NOTE: the set value is stored even when the procedure is exited by waiting for the time-out to expire.

HOW TO LOCK THE KEYBOARD

1. Press and hold the **UP** and **DOWN** arrow keys simutaneously for more than 3 seconds
2. The **POF** message will be displayed and the keyboard will be locked.
   At this point, it will be possible only to see the set point or the MAX or Min temperature stored.
3. If a key is pressed more than 3 seconds the **POF** message will be displayed.

HOW TO UNLOCK THE KEYBOARD

Press and hold the **UP** and **DOWN** arrow keys simutaneously for more than 3 seconds until the **Pon** message is displayed.

Maximum and Minimum Temperature

HOW TO SEE THE MINIMUM TEMPERATURE

1. Press and release the **DOWN** key.
2. The **Lo** message will be displayed followed by the minimum temperature recorded.
3. By pressing the **DOWN** key again or waiting 5 seconds, the normal display will be restored.

HOW TO SEE THE MAXIMUM TEMPERATURE

1. Press and release the **UP** key.
2. The **Hi** message will be displayed followed by the maximum temperature recorded.
3. By pressing the **UP** key again or waiting 5 seconds, the normal display will be restored.

HOW TO RESET THE MAX AND MIN TEMPERATURE RECORDED

1. Press and hold the **SET** key for more than 3 seconds, while the maximum or minimum temperature is displayed. (**rSt** message will be displayed)
2. To confirm the operation, the **rSt** message will blink and the normal temperature will be displayed.

TROUBLE SHOOTING GUIDE

COMPLAINT	*SYMPTOM*	*PROBABLE CAUSE*	*ACTION*
Unit will not run	Controller not on Evaporator not on	No power	Check circuit breaker. Check voltage at unit receptacle. Power must match unit requirements, 15 Amps min.
		Unit power switch off	Check rocker switch inside panel.
Compressor not running or stalls on startup	Controller on	LED/Snowflake not on	Check programmed set point and indicated temperature.
		LED/Snowflake blinking	Unit off on anti-short cycle time delay - 5 min.
		A/C does not respond to controller	Defective controller
	Compressor hums for 3 - 5 seconds, then trips	Insufficient power under load	Check power source, wiring and circuit breaker capacity, under load, using power quality meter.
		Defective or disconnected run capacitor	Have qualified A/C tech test and replace.
		Faulty compressor	Have qualified A/C tech test winding impedance: C to R, C to S, and C to ground. Replace compressor if defective.
	Compressor short cycling	Anti-short cycle time too short	Check anti-short cycle time setting. Minimum setting is 5 minutes.
	Compressor overload open	Compressor overheating	Locate cause of overheating. Check actions above.
	Evaporator not running	Defective evaporator motor CA Alarm on	Clean/repair/replace
	Condenser not running	Defective condenser motor HA Alarm on	
	Evaporator running CA alarm displayed	Set point too low	Adjust temperature set point.
		Low ambient	Warm unit / Install low ambient crankcase heater.
		Evaporator coil frozen	Thaw and clean coil. Check for clogged drain. If enclosure obstruction causing air re-circulation, remove obstruction.
		Low refrigerant	Have qualified A/C tech check.

V1.4

COMPLAINT	*SYMPTOM*	*PROBABLE CAUSE*	*ACTION*
Unit runs but does not cool properly	Compressor cycling	Cycling on set point	Reprogram set point or increase Hy
	HA alarm intermittent	Dirty condenser	Clean condenser coil.
		Condenser air flow blocked	Installation must meet minimum clearance for condenser air flow. Check action items under noise / test air temperature.
		Adjacent unit heating air	Install baffle/deflector or move unit(s).
	Perform touch test: Compressor hot (190°F) suction accumulator cold (50 to 65°F)	Good condenser	Check evaporator section
		Restricted air flow	Clean evaporator. Check for air blockage.
		Re-circulating air flow	Remove restriction/Install baffle/Install fan.
	Suction accumulator is hot (>75°F)	Faulty condenser motor	Clean/lubricate/repair/replace.
		Dirty filter	Clean or replace condenser filter.
		Dirty condenser coil	Clean coil and filter using degreaser.
		Re-circulating hot air from adjacent unit	Redirect air flow with baffle or fan.
			Provide sufficient room for air flow.
		Low refrigerant	Have qualified tech check unit.
Unit vibrating or noisy	Noise	Possible freight damage	Inspect all points of mechanical contact between tubing and shroud or chassis.
		Tube rattling against shroud	
		Compressor rattling against shroud	Inspect compressor mounting.
		Foreign object in fan/blower	Clean blowers; tie wrap any loose wiring. Replace air filter to prevent recurrence.
		Broken or bent fan blade.	Replace blower unit or fan blade.
		High refrigerant pressure due to dirty air filter, blocked or re-circulating condenser air flow or dirty condenser	Test air temperature entering and leaving condenser. Entering should = ambient. Leaving should = entering + 15 degrees. Clean condenser with degreaser and low pressure rinse. Clean or replace filter.
Condensate draining from overflow	Drains during normal operation	Door partially open or air leaks between A/C and enclosure	Check door gasket and gasket compression on closing. Check A/C mounting gasket. System must be closed loop.
Condensate draining inside unit	Water leaking out around compressor	Blockage in evaporator drain lines prevents water getting to the boil off pan	Clean condensate drains with degreaser. Check for crushed or blocked drain lines. Clean evaporator coil and check for source of contamination.
	Iced up evaporator coil	Defective evaporator blower	Have qualified A/C tech clean, repair or replace.
		Low refrigerant	Have qualified A/C tech check

V1.4

Warranty

ISC products are warranted to be free of defects in workmanship, materials and components. The following warranty period applies from date of shipment for one year.

The above warranty applies when the equipment is operated under the following conditions:

- Ambient temperature not in excess of performance rating in normal atmosphere or as stated on product nameplate
- Voltage variation no greater than ± 10% from nameplate rating
- Frequency variation no greater than ± 3Hz from nameplate rating
- Maximum cooling load no higher than air conditioner nameplate rating
- Waiting five minutes before restarting air conditioner after intentional or accidental shutoff
- Compliance to all other installation, maintenance and operating instructions, as supplied

ISC cannot assume responsibility for misapplication of its products or the erroneous selection of an inappropriate product by a non-authorized ISC representative. Our applications engineers will gladly assist in the selection of the proper product provided all required details of the application are furnished.

ISC assumes no liability beyond the repair or replacement of its own product. This Warranty does not cover:

- Labor or reimbursement of labor for evaluation, removal, installation, repair, or cost of any warranted part, except at the ISC factory in Dallas, Texas
- Use of equipment for other than its designed purpose or operating conditions
- Operation in harsh, oily, corrosive or other abnormal environmental conditions, without the proper filtration, sealing, protective coatings and/or weather protection
- Damage to hermetic system resulting from continuous operation with dirty or clogged air filters or improper or negligent maintenance
- Use of refrigerant other than designated
- Customer modification or abuse
- Shipping damage or other accident
- Repair or service by unauthorized personnel.

Cracked or broken hermetic tubing or brazed joints caused by shipping damage or mishandling are not covered under the Warranty.

Claims for shipping damage are the responsibility of the Consignee. Timely claims must be filed with the freight carrier.

Any and all conditions resulting from noncompliance with the preceding operating conditions
The purchaser assumes the responsibility of grounding the unit and installing it in accordance with local electrical and safety codes, as well as the National Electric Code (NEC) and OSHA.

THIS WARRANTY CONSTITUTES THE ENTIRE WARRANTY WITH RESPECT TO THE PRODUCT AND IS IN LIEU OF ALL OTHERS, EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY AND WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE AND IN NO EVENT IS ISC RESPONSIBLE FOR ANY CONSEQUENTIAL DAMAGES OF ANY NATURE WHATSOEVER.

Return Material Authorization (RMA) Procedure

All returns require a Return Material Authorization **(RMA)** number whether the return is for warranty or non-warranty repair, rotation of stock, damage or any other reason.

Returns without an RMA number will be refused

Simply call ISC Customer Service at 1-800-836-7472 for an RMA number

Customer Service will help resolve any problems with the unit or installation.
If this is not satisfactory, an RMA number will be provided

Please be ready to provide your:

- Purchase order number and date
- Product description
- Model number
- Serial number
- Reason for request
- Customer name and contact phone, fax number, address and email
- Shipping method

Pack unit in a suitable packing for shipment, preferably the original packaging if available.

- If suitable packing is not available, arrange for packaging to be shipped to you.
- Air Conditioners must be returned in an upright position properly secured to a pallet.
- Tip unit to empty water from the evaporator and boil off pans.
- Improper packaging may void warranty
- Air Conditioners shipped laying down will void the warranty.
- Clearly mark the RMA number on the box.
- Customer will pay all freight charges.
- Collect shipments will be refused
- Shipments without RMA number will be refused.

OUT OF WARRANTY REPAIR

If your ISC air conditioner is out of warranty and requires repair, simply call
ISC Customer Service at 1-800-836-7472 for an RMA number. Customer Service will help you determine what repairs or parts are needed and if possible provide an estimate of the cost.

Shipments arriving without an RMA number will be refused and returned.

After the unit is received and diagnosed, you will receive a shop estimate on the work and parts needed. The repair and test process may uncover other issues for which you will be informed and given quotes for the work needed.

Made in USA

KOOLTRONIC
COOLING EXCELLENCE FOR ELECTRONICS

ADVANTAGE
RT TOP MOUNT
SERIES

Keep This Manual With Air Conditioner

AIR CONDITIONER

OPERATOR'S MANUAL

CAUTION

BEFORE INSTALLING AND USING THIS AIR CONDITIONER, IT IS IMPORTANT THAT THIS MANUAL BE READ AND UNDERSTOOD THOROUGHLY

KOOLTRONIC, INC.
30 Pennington-Hopewell Road
Pennington, NJ 08534
609•466-3400
FAX: 609•466-1114
www.kooltronic.com

900-037-03

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I. Introduction

Kooltronic Air Conditioners are designed to provide a cool, dehumidified environment for your electronic components. There are models to fit virtually all sizes and shapes of electronics enclosures, in capacities ranging from 1,000 to 30,000 BTU/H. Our "closed-loop" design also ensures that your components will not be exposed to hot, dirty operating conditions.

This Manual provides you with the necessary general information for properly installing and operating standard Kooltronic Air Conditioners. Technical data and mounting instructions are presented on pages 7 through 11.

Revised January, 2007
Revised August, 2008
Revised October, 2008
Revised July, 2010

II. Incoming Inspection

Kooltronic Air Conditioners are designed, built and packaged to withstand the shock and vibration normally associated with shipment by common carriers. Occasionally improper handling during shipping causes damage. Such handling could include unbanding of palletized shipments, failing to respect **"This Side Up"** arrows, rough handling, falling off conveyors, excessive vibration, crushing, etc. Therefore, a thorough inspection should be done upon receipt of all shipments. Any carton tears, dents, scratches, loose articles or evidence of oil are signs of damage and should be noted on the Freight Bill. Cartons should be opened promptly and the units inspected for CONCEALED DAMAGE. Kooltronic Air Conditioners must be delivered in the proper mounting position to assure that damage to the compressor has not occurred during shipping. Any Kooltronic Air Conditioner that is delivered removed from the banded pallet, lying down or double stacked should be refused.

An immediate claim MUST be filed with the freight carrier and an inspection requested. Retain all packing materials. Kooltronic cannot assume responsibility for Consignee's failure to file a timely freight claim.

III. Product Handling:

1) Do not attempt to operate your Kooltronic Air Conditioner until you read and thoroughly understand this Manual. See section **VI PRE-INSTALLATION TESTING.**

2) Before operating the Kooltronic Air Conditioner be certain that it is placed in its correct mounting position. This placement must be done a minimum of 5 minutes prior to operating in order to allow the compressor oil to drain to the compressor sump area.

CAUTION

Kooltronic Air Conditioners must be operated in their proper mounting position. If attempts are made to operate a unit that is not in its designed mounting position, permanent compressor damage will occur. This action will void the warranty. To avoid compressor damage do not tip the unit more than 45° from its proper mounting position.

3) Before operating this unit, all electrical wiring must be checked to assure the proper connection to the correct power source. Minimum circuit ampacity should be at least 125% of the amperage found on the air conditioner label for the corresponding voltage. Do not exceed the maximum fuse size found on the label.

4) We do not recommend that Air Conditioners be shipped to their final destination attached to an enclosure. In the event that the Air Conditioner needs to be shipped attached to an enclosure it is strongly recommended that proper support be provided for the Air Conditioner. Excessive vibration can occur if Air Conditioners are not properly supported when shipped on enclosures, increasing the potential for internal damage and voiding the warranty.

5) **PROCEDURE FOR PROPER PACKING AND SHIPMENT OF KOOLTRONIC AIR CONDITIONERS:**

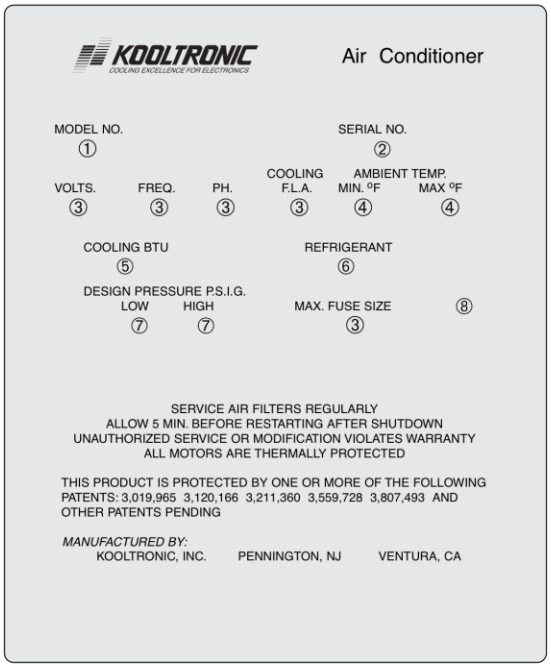
- Keep Air Conditioner in proper upright position indicated by arrow markers.
- Pack Air Conditioner in an appropriate carton (preferably original carton if possible), with adequate internal protective packaging, making sure carton is marked and is kept in correct upright position.
- For local, controlled transportation, strap carton to a secure part of truck to prevent falling or sliding, minimize vibration, etc.
- For common carrier shipment, band unit(s) securely to a pallet. Unpalleted shipment risks severe damage which voids the warranty.

IV. Product Identification and Labels

Each Kooltronic Air Conditioner includes an identification label. This label provides:

① Model Number
② Serial Number
③ Electrical power characteristics
④ Maximum and minimum ambient operating temperatures
⑤ Cooling capacity
⑥ Type and amount of refrigerant required for recharging
⑦ Design Pressure
⑧ Underwriters Laboratories Inc. Listed or Recognized Marks and NEMA ratings

We recommend you copy this information from your unit.



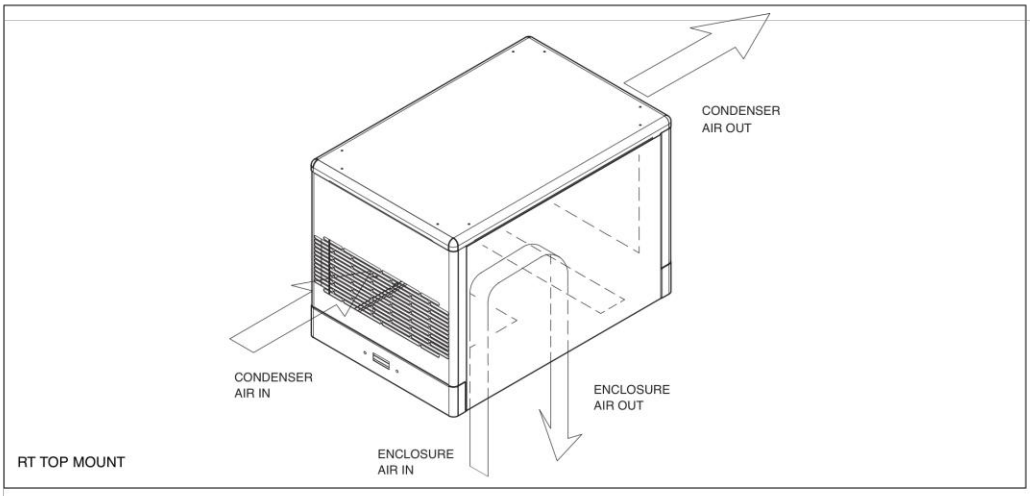
①② When ordering parts, specify the Model Number and Serial Number.

③ Before operating, be sure that the power source matches these requirements.

④Make sure that these parameters are met. Failure to do so may result in permanent damage to the unit.

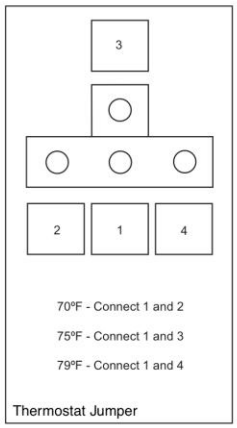
⑥ Use of incorrect type or amount of refrigerant will adversely affect performance and may damage the unit.

V. Principles of Operation



Kooltronic Air Conditioners are required when the equipment operating temperature must be kept near or lower than the ambient room temperature, and/or the cabinet must be sealed from dust, fumes, oil, corrosives and other contaminants. These Air Conditioners utilize a "Closed-Loop Cooling System" to ensure optimum performance of the installed components.

Closed-Loop cooling seals the electronic enclosure from hostile elements in the environment. Two separate circulation systems are employed. The internal system cools and dehumidifies the air inside the cabinet, totally isolating the sensitive electronics and other components from the environment. The external system uses circulating ambient air or water to discharge the heat removed from the electronics. The heat is dissipated from the enclosure by means of the vapor compression refrigeration cycle. This takes place in a hermetically-sealed refrigeration system, utilizing either an air-cooled or water-cooled condenser heat exchanger. The warm air inside the enclosure is drawn through the evaporator coil where it is cooled, dehumidified and returned.



Any enclosure moisture accumulated on the evaporator coil is collected in the condensate tray and removed through the drain tube to the condensate evaporator. Condensate evaporates in the condensate evaporator and is released to the ambient air by the condenser impeller.

The heat removed through the evaporator coil is transferred by the compressed refrigerant to the condenser coil. Ambient air is then passed through the condenser coil, where it absorbs the heat and is then discharged to the environment.

This unit is equipped with a Low Temperature Thermostat to prevent the evaporator coil from freezing. In conditions of low ambient temperature and low enclosure load, the thermostat regulates the return air temperature from 75°F to 86°F. The standard set point of the Low Temperature Thermostat is 75°F. The set point can be changed to 70°F or to 79°F by changing the location of the thermostat jumper (See illustration).

The Low Temperature Thermostat has a test start relay. When the air conditioner is turned on it will run constantly for the first 15 minutes regardless of external temperatures. Afterwards, if the entering evaporator air temperature is lower than the thermostat set point, the compressor and condenser blower will stop, and the thermostat will begin to control the air conditioner.

The crankcase compressor heater allows the unit to start with an ambient temperature of 0°F. In applications having frequent voluntary heat load fluctuations, an optional Compressor Short Cycle Protector is recommended.

IMPORTANT NOTE

The temperature of the returning air to the air conditioner is displayed on the exterior panel of the unit. This is considered the maximum temperature within the enclosure and not the temperature of the air supplied to the enclosure.

When the Kooltronic Air Conditioner is properly sized it should operate constantly and maintain 75°F to 115°F enclosure temperatures, depending on the ambient temperatures.

VI. Pre-Installation Testing

Before mounting the air conditioner to the enclosure, test for proper operation. This will verify the shipping integrity of the system. Please follow the steps below prior to installation.

CAUTION

The air conditioner must be standing in its proper mounting position for a minimum of five (5) minutes prior to testing. Failure to follow this procedure will cause permanent damage to the compressor. To avoid compressor damage do not tip the unit more than 45° from its proper mounting position.

1. The unit must sit in an upright position at a minimum room temperature of 65°F to allow the system to warm-up. This is particularly important during winter months.
2. Refer to the identification label for proper electrical voltage and current requirements. Connect the power cord to a properly grounded and fused electrical supply, leaving electrical power to the unit turned off.
3. Elevate the unit approximately 3" above the floor to ensure proper evaporator airflow. Do not block evaporator air inlet on bottom of unit.
4. Note the factory thermostat setting which is 75°F.
5. Turn the electrical power on.
6. Verify that the evaporator blower or fan is running.
7. Verify that the condenser blower or fan is running. **Note:** The start of the condenser fan or blower will be delayed until the system pressures rise.
8. Operate the air conditioner for approximately ten (10) minutes. During this period no unusual noise or vibration should be evident. Both the evaporator and condenser fans or blowers should be delivering air through their respective discharge ports. The cool air discharged should be less than 70°F when the room temperature is between 70°F and 80°F.
9. Turn off the electrical power and disconnect the air conditioner from the power source.
10. If any cover plug was removed to adjust the unit, be sure to replace it in order to maintain the integrity of the closed-loop airflow system.

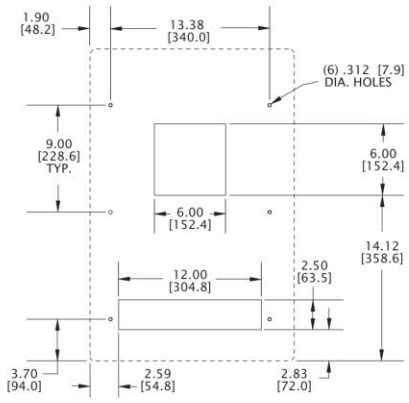
NOTE: Before shipment all Kooltronic Air Conditioners are subjected to a performance test.

VII. Specific Model Data

Mounting

FIGURE 1

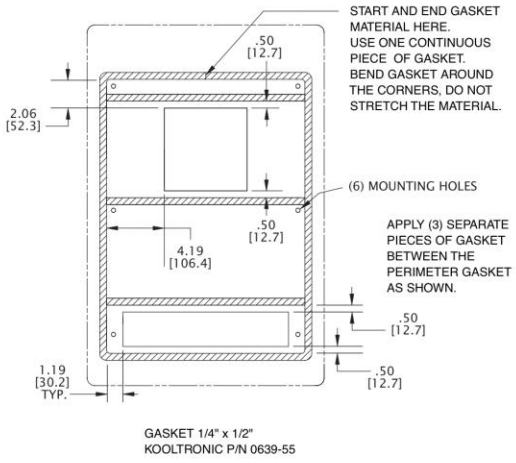
MOUNTING PLAN



Dimensions, inches [metric], are for reference only and are subject to change.

FIGURE 2

GASKET PLACEMENT



Dimensions, inches [metric], are for reference only and are subject to change.

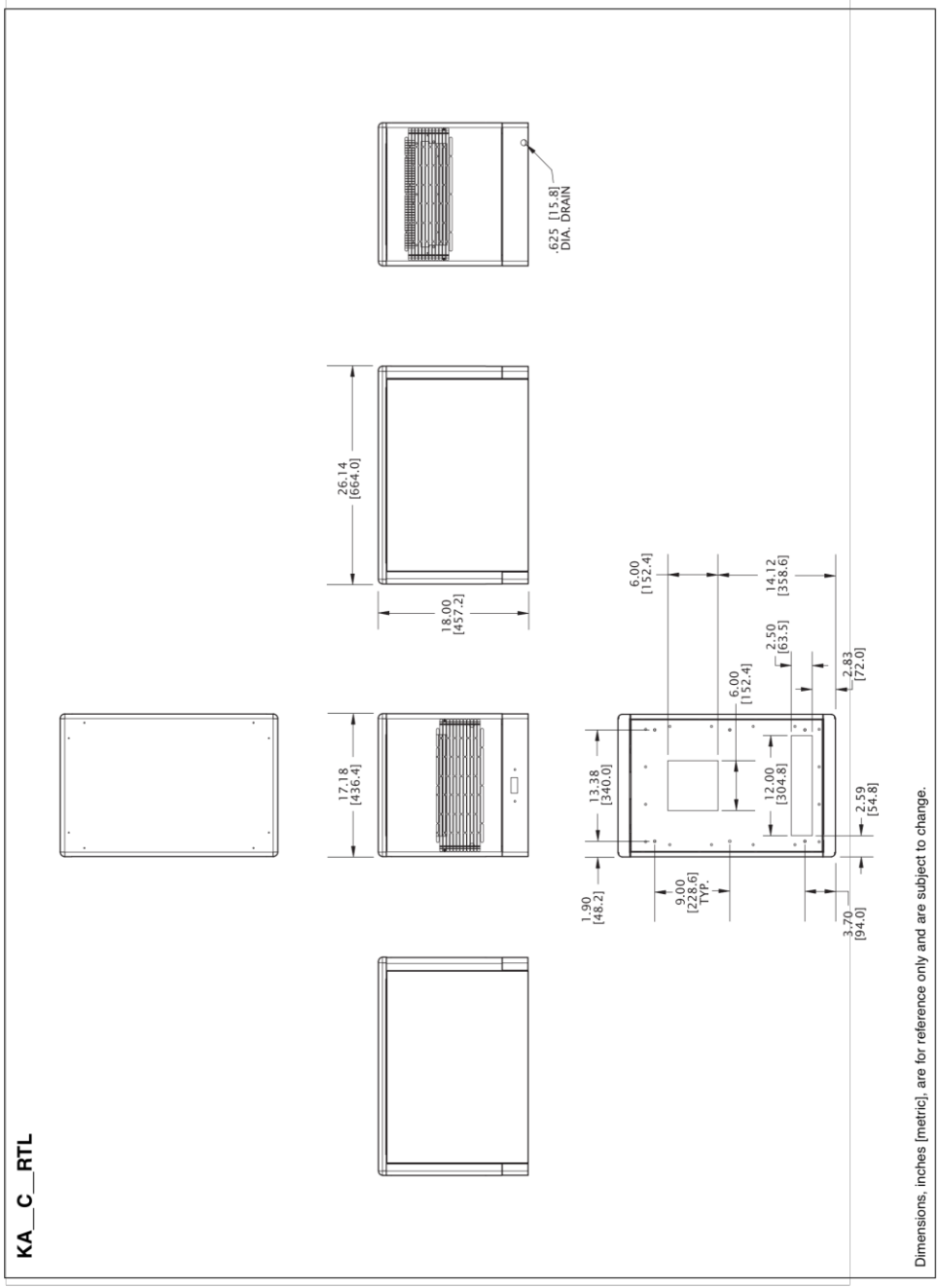
Kooltronic Air Conditioners have been engineered to be installed easily. To avoid damaging your Air Conditioner, please read the following information before installation.

- Top-Mounted Air Conditioners for external top installation contain weld-nuts.
- Refer to Figure 1 above for the location of all mounting holes and cutouts.
- Make sure the cutouts don't interfere with components inside your cabinet.
- Proper alignment of all air inlets and outlets is essential for optimum performance of the Air Conditioner.
- All externally-mounted Air Conditioners must be fully gasketed to ensure proper sealing. This seal is necessary to maintain the integrity of the closed loop system. See Gasket Placement, Figure 2, above.
- Use all existing mounting holes to insure stability and a tight seal.
- High strength mounting screws are recommended.
- The external drain hose must not be elevated above the exit port. Improper mounting will impede the flow of condensate and may cause internal malfunctions.

CAUTION

When unmounting the unit from the cabinet, make certain to keep the unit level to avoid spilling any water that may be in the condensate pan.

Drawings and Dimensions



Technical Data

Model	BTU/H Rating	Ambient Temp. °F Max.	Ambient Temp. °F Min.	Volts	Hz	* Cooling Amps	** Heating Amps	Approximate Weight (lbs.)
KA4C3RTL	**3000**	**125**	**0**	**115**	**60/50**	**12.5/12.0**	**6.0/5.7**	**125**
K2A4C3RTL	**3000**	**125**	**0**	**230**	**60/50**	**6.0/5.7**	**4.0/7.5**	**125**
KA3C6RTL	6000	120	0	115	60/50	13.5/13.3	8.0/14.6	131
K2A3C6RTL	6000	120	0	230	60/50	6.0/5.7	4.0/7.5	131
KA3C12RTL	12000	120	0	115	60/50	18.0/19.0	8.0/14.6	140
K2A3C12RTL	12000	120	0	230	60/50	9.0/9.2	4.0/7.5	140
KA4C6RTL	**6000**	**125**	**0**	**115/100**	**60/50**	**14.6/14.3**	**8.0/14.6**	**131**
K2A4C6RTL	**6000**	**120** **120**	**0** **0**	**230/208** **220/200**	**60** **50**	**6.3/7.0** **5.6/6.0**	**4.0/7.5** **4.0/7.5**	**131**
KA4C12RTL	**12000**	**120**	**0**	**115/100**	**60/50**	**17.6/18.7**	**8.0/14.6**	**140**
K2A4C12RTL	**12000**	**125** **125**	**0** **0**	**230/208** **200**	**60** **50**	**8.7/9.3** **8.5**	**4.0/7.5** **4.0/7.5**	**140**

Units in BOLD are current standard products. Other units are prior product offerings and shown for reference only.

* Rating shown is for operation at maximum ambient temperature.

** Optional Single Enclosure Heater/Double Enclosure Heaters.

Major Component Replacements

Part	KA4C3RTL Part Number	KA3C6RTL Part Number	KA3C12RTL Part Number	KA4C6RTL Part Number	KA4C12RTL Part Number
Compressor	0665-116	0665-71	0665-76	0665-119	0665-131
Compressor Capacitor	N/A	0452-54	0452-54	0452-32	0452-52
Condenser Blower Motor	0261-287	0261-287	0261-287	0261-287	0261-287
Condenser Blower Capacitor	0452-03	0452-03	0452-03	0452-03	0452-03
Evaporator Blower Motor	0265-03	0194-76	0194-14	0194-76	0194-14
Evaporator Blower Capacitor	N/A	0452-65	0452-65	0452-65	0452-65
Evaporator Coil	0667-45	0666-27	0666-27	0666-27	0666-27
Condenser Coil	0666-27	0666-30	0666-30	0666-30	0666-30
Filter	10871F	10871F	10871F	10871F	10871F

Part	K2A4C3RTL Part Number	K2A3C6RTL Part Number	K2A3C12RTL Part Number	K2A4C6RTL Part Number	K2A4C12RTL Part Number
Compressor	0665-107	0665-72	0665-77	0665-120	0665-125
Compressor Capacitor	N/A	0452-12	0452-14	0452-32	0452-32
Condenser Blower Motor	0261-288	0261-288	0261-288	0261-288	0261-288
Condenser Blower Capacitor	0452-03	0452-03	0452-03	0452-03	0452-03
Evaporator Blower Motor	0265-06	0194-101	0194-15	0194-101	0194-15
Evaporator Blower Capacitor	N/A	0452-64	0452-64	0452-64	0452-64
Evaporator Coil	0667-45	0666-27	0666-27	0666-27	0666-27
Condenser Coil	0667-27	0666-30	0667-30	0666-30	0667-30
Filter	10871F	10871F	10871F	10871F	10871F

Standard Features

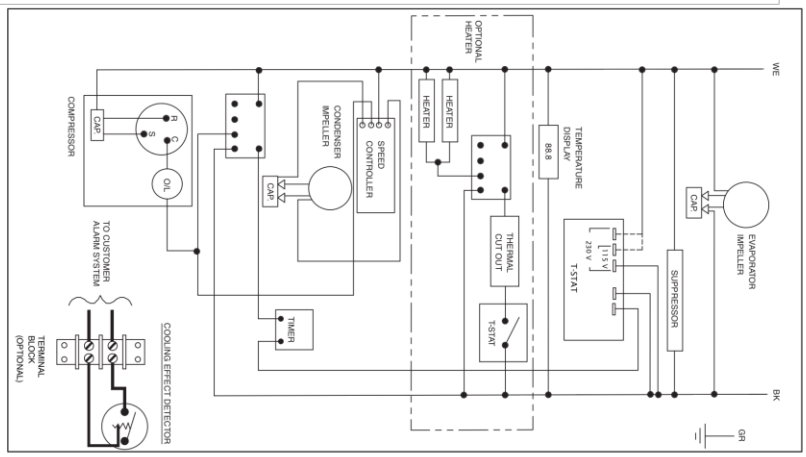
Low-ODP Refrigerant
Low Temperature Control Thermostat
Crankcase Compressor Heater (3,000 BTU/H Models Only)

NEMA 3R Rating Maintained
Head Pressure Control System
EMI/RFI Suppressor

Wiring Schematics

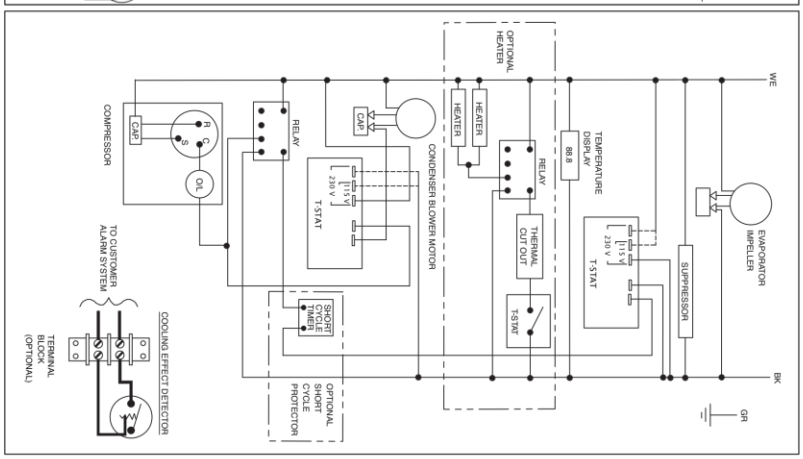
K_A3C6RTR & K_A3C12RTR

WD-1153 (Unit Serial Numbers up to and including L06A5574.)



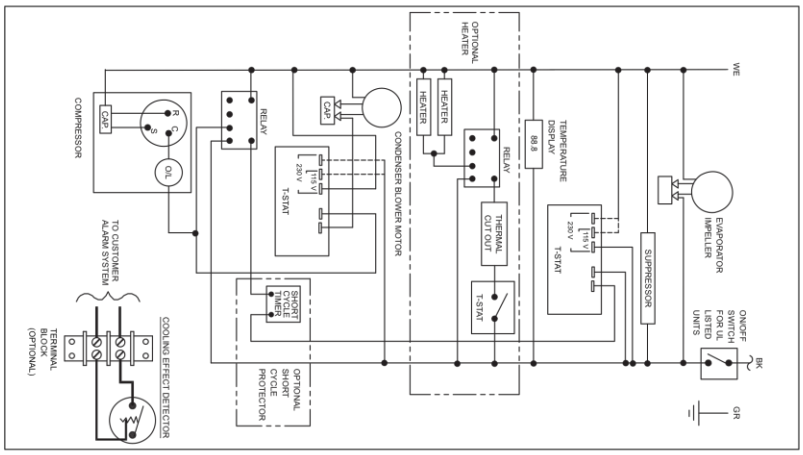
K_A3C6RTR & K_A3C12RTR

WD-1153 Rev. A (Unit Serial Numbers L06A5575 and higher.)

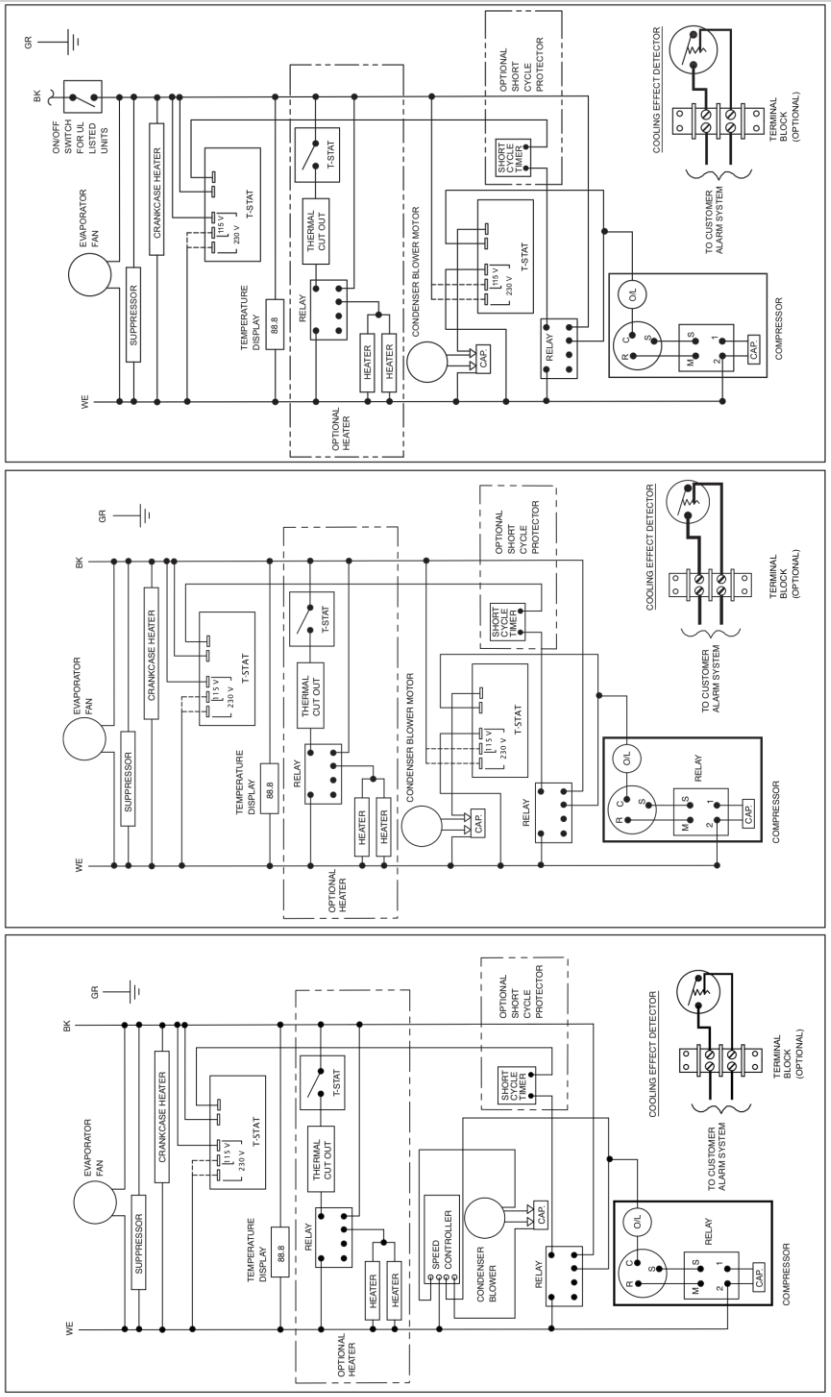


K_A3C6RTL & K_A3C12RTL

WD-1252



Wiring Schematics



VIII. Maintenance

Kooltronic Air-Cooled Air Conditioners require routine cleaning of the condenser coil (if necessary) and the air filters to assure unimpeded airflow through the condenser heat exchanger. It is not possible to recommend specific condenser coil or filter cleaning intervals, since the level and the nature of airborne particulate matter differs widely with each installation. It is generally sufficient to clean the condenser coil and/or the aluminum mesh filter when the outer surfaces appear covered with a thin layer of dust, lint or other foreign matter. The condenser coil can be blown out with air, or washed, depending on the foreign matter involved. Disconnect power and remove air conditioner from cabinet before using liquids to clean the unit. (see below - **Filter and condenser coil service**). The aluminum mesh filter can be washed with warm water. Appropriate disposable replacement filters are available from Kooltronic.

If routine condenser coil or filter service is neglected or delayed, the air conditioner will not perform at its design capacity. The first indication of an excessively clogged condenser coil or air filter is usually a gradual increase of temperature within the equipment cabinet. If operation is continued under these conditions, the compressor will be shut off by the thermal overload device. The compressor will restart when its external temperature drops below the protector threshold setting and the compressor will continue to cycle on and off. Continued operation under these conditions will cause damage, shorten compressor life and void the warranty.

A. Filter and condenser coil service

Kooltronic RT Top Mount Air Conditioners feature an easily removable inlet filter to facilitate necessary cleaning. To access the filter, loosen the torx screws and remove the front grille. Push the filter upward and pull the bottom edge forward to remove. After removal, the filters should be flushed under warm running water with clean side up. If the accumulated dirt is oily, washing in a detergent bath is recommended, followed by a warm water wash as above. To reinstall the filter, insert the filter into the filter holder and push the filter back into position. Reinstall the front grille using the torx screws.

The condenser coil must be cleaned using pressurized air. If liquid cleaning solutions are used, it is necessary that the air conditioner be removed from the cabinet to avoid liquids draining into the electronics. Disconnect power before performing this type of operation.

CAUTION

Do not operate the air conditioner for extended periods of time with the filter removed. The condenser coil may become clogged with dust or lint from the air entering the face. A clogged condenser coil is not readily detected and will give the same reaction as a clogged filter. A clean filter is the best protection.

B. Blowers

The design life of the blowers employed in all Kooltronic Air Conditioners is substantially in excess of 20,000 hours. All Kooltronic condenser and evaporator blowers are equipped with UL/CSA permanently-lubricated precision ball-bearing motors, with automatic-reset thermal overload protectors. If field replacement of a blower motor is necessary, most blower assemblies, including the mounting plate, are readily removable. Each of the blower mounting plates is held to the air conditioner cabinet structure by screws and nuts. For installation of the replacement blower, electrical connections may be broken at the terminal block, or power leads may be cut and appropriately spliced together.

CAUTION

Before opening the air conditioner, disconnect all power.

C. Compressor

All Kooltronic compressors are approved by UL and CSA, and require no maintenance. They are hermetically sealed and charged at the factory, and equipped with automatic-reset thermal overload protectors.

If the compressor or the hot gas bypass valve fails, it is strongly recommended that the air conditioner be returned to Kooltronic for service.

D. Refrigerant Loss

Kooltronic Air Conditioners are subjected to a series of tests to detect refrigerant leaks, during and after manufacture. It is possible that shipping or other damage, or microscopic leaks over a long period, may result in the need for replenishment of refrigerant charge. **When it has been verified by a Certified EPA Technician that a refrigerant shortage does exist, the leak must be repaired. Then the unit may be evacuated and recharged in the field by a Certified EPA Technician only.**

CAUTION

Refer to the data on the unit name plate which specifies the type of refrigerant and the amount of charge in ounces.

E. Relocation

If your Kooltronic Air Conditioner has to be moved to another location by truck, the following precautions should be taken:

- De-mount the air conditioner from the equipment, controller or enclosure.
- Conform to the applicable provisions of PROCEDURE FOR PROPER PACKING AND SHIPMENT OF KOOLTRONIC AIR CONDITIONERS in this manual under *Section III. "PRODUCT HANDLING".*

IX. Trouble-Shooting

Each Kooltronic Air Conditioner is engineered for performance and built for reliability. They are designed to require only routine maintenance. If your air conditioner should require service, we have compiled a trouble-shooting chart to assist your service personnel. If additional assistance is required contact Kooltronic at (609) 466-3400.

Problem	Cause	Solution
Unit not Cooling	No Power	Check Power Source and Electrical Connections
	Loss of Refrigerant	Locate and repair leak
	Evaporator or Condenser Blower not operating	Replace Motor, Capacitor or entire Assembly
	Filter clogged	Clean or replace Filter
	Clogged Evaporator or Condenser Coil	Clean Coil
	Low Temperature Control (Thermostat) improperly set	Lower setting until unit starts
	Low Temperature Control (Thermostat) defective	Replace Thermostat or Relay when applicable
	Failed Compressor	Replace Compressor
Ice on Evaporator Coil	Insufficient Heat Load or Unit Oversized for Application	Contact Kooltronic
	Failed Evaporator Blower	Replace Evaporator Blower Motor or Assembly
	Clogged Evaporator Coil	Clean Coil
Condensate draining continuously	Enclosure not properly sealed	Check and seal all openings
	Excessive opening of Enclosure	Eliminate the frequency of door opening
Excessive vibration	Defective Motor in Blower	Replace Motor
	Defective Wheel in Blower	Replace Wheel
	Compressor Loose	Tighten Mounting Bolts
Compressor Inoperative	Low line Voltage	Check Nameplate Voltage against supply
	Loss of Compressor Oil	Replace Compressor
	Loss of Refrigerant	Locate and repair leak
	Failed Compressor Capacitor	Replace Capacitor
	Thermal Overload	Contact Kooltronic
	Power interruptions	Allow Compressor time to reset
Refrigerant or Oil leaks	Crack or pin hole in tubing or brazed joint	Replace tubing or rebraze joint
Condensate on the outside surface of the Enclosure	Insufficient Heat Load or Unit oversized for application	Contact Kooltronic

X. Standard Warranty

KOOLTRONIC products are warranted to be free of defects in workmanship, materials and components. The following warranty periods apply from date of shipment:

- Air moving devices/components and hermetic system components: Two years
- Non-operating parts, except filters: 5 years

The above warranty applies when the equipment is operated under the following conditions:

- Ambient temperature not in excess of 125°F (52°C) in normal atmosphere or as stated on product nameplate
- Voltage variation no greater than ± 10% from nameplate rating
- Frequency variation no greater than ± 3Hz from nameplate rating
- Maximum cooling load no higher than air conditioner nameplate rating
- Waiting five minutes before restarting air conditioner after intentional or accidental shutoff
- Compliance to all other installation, maintenance and operating instructions, as supplied
- The purchaser assumes the responsibility of grounding the unit and installing it in accordance with local electrical and safety codes, as well as the National Electric Code (NEC) and OSHA

  KOOLTRONIC cannot assume responsibility for mis-application of its products or the erroneous selection of an inappropriate product by a non-authorized KOOLTRONIC representative. Our applications engineers will gladly assist in the selection of the proper product, provided all required details of the application are furnished.

KOOLTRONIC assumes no liability beyond the repair or replacement of its own product, return transportation prepaid by customer. This Warranty does not cover:

- Labor or reimbursement of labor for evaluation, removal, installation, repair, or cost of any warranted part, except at the KOOLTRONIC factory in Pennington, NJ
- Use of equipment for other than its designed purpose or operating conditions
- Operation in harsh, oily, corrosive or other abnormal environmental conditions, without the proper filtration, sealing, protective coatings and/or weather protection
- Damage to hermetic system resulting from continuous operation with dirty or clogged air filters or improper or negligent maintenance
- Use of refrigerant other than designated
- Customer modification or abuse
- Shipping damage or other accident (Claims for shipping damage are the responsibility of the customer. Timely claims must be filed by the customer with the freight carrier)
- Cracked or broken hermetic tubing, brazed joints or other internal damage caused by shipping or mishandling
- Damage caused by shipping units attached to an enclosure
- Any and all conditions resulting from noncompliance with the preceding operating conditions
- Returned freight must be paid for by customer
- **This standard warranty does not apply to custom products. Consult your Kooltronic representative for limitations**

THIS WARRANTY CONSTITUTES THE ENTIRE WARRANTY WITH RESPECT TO THE PRODUCT AND IS IN LIEU OF ALL OTHERS, EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY AND WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE AND IN NO EVENT IS KOOLTRONIC RESPONSIBLE FOR ANY CONSEQUENTIAL DAMAGES OF ANY NATURE WHATSOEVER.

RETURN AUTHORIZATION (RA) PROCEDURE

- All returns require a Return Authorization number whether the return is for warranty or non-warranty repair, rotation of stock, damage or any other reason. Returns without an RA number will be refused.
- Customer must call the KOOLTRONIC Customer Service Department, Pennington, New Jersey (609 · 466 · 3400) to obtain an RA number.
- The following information is required when an RA is requested:
  - Original customer Purchase Order number and date
  - Date product was received by customer
  - Number of parts to be returned
  - Product description, model and serial number
  - Reason for return
  - Action requested
  - Contact name, telephone, FAX numbers and e-mail address
- Pack unit in a suitable container for shipment, preferably the original packaging if available. All Air Conditioners and Heat Exchangers must be returned in an upright position properly secured to a pallet. **Improper packaging may void warranty claim.** If an Air Conditioner or Heat Exchanger is received laying down or shipped via UPS or similar service the warranty will be void.
- Mark box prominently with KOOLTRONIC's Return Authorization Number.
- Enclose all pertinent documents.
- Freight charges on all products returned to KOOLTRONIC shall be paid by the customer. Collect shipments will be refused.
- Warranty repaired units will be returned to customer at Kooltronic expense only within the Continental USA.